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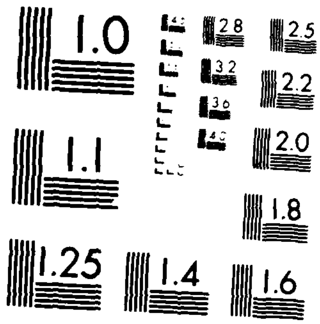

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INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

AD A124153

For
McClellan Air Force Base, California

CH2M HILL

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Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

JULY 1981

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Hazardous Waste Disposal Sites at McClellan Air Force Base
Groundwater Pollution and Potential for Migration Off-Base

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The records search resulted in the identification of areas of concern for Polychlorinated Biphenyl (PCB) contamination at site at the northwest corner of the runway clear zone, and Trichloroethylene (TCE) groundwater contamination. The records search recommended follow-on monitoring and sampling programs to determine the extent of contamination and restoration/containment operations required.

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INSTALLATION RESTORATION
PROGRAM RECORDS SEARCH

For

McCLELLAN AIR FORCE BASE, CALIFORNIA

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

By

CH2M HILL
Gainesville, Florida

July 1981

Contract No. F08637 80 G0010 0002

NOTICE

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FOREWORD

FOREWORD

The organization of this report is summarized below for the benefit of the reader:

- Executive Summary
- Section I--General (introductory and background information)
- Section II--Past and Current Activity Review (waste disposal practices)
- Section III--Installation Assessment (conclusions and recommendations)
- Figures--Includes all report figures (1 through 27) referred to in the text
- References--Includes a consolidated list of references. (Reference numbers are denoted in the text by brackets [ ].)
- Appendices--Includes attached Appendices A through P. (Note that installation photographs [Figures A-1 through A-21] taken during the helicopter overflight are located in Appendix A.)

LIST OF ACRONYMS, ABBREVIATIONS,
AND SYMBOLS USED IN THE TEXT

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

AFB	Air Force Base
AFESC	Air Force Engineering and Services Center
AFLC	Air Force Logistics Command
bls	below land surface
CE	Civil Engineering
COD	Chemical oxygen demand
CRWQCB	California Regional Water Quality Control Board
DLA	Defense Logistics Agency (also known as the Defense Property Disposal Office [DPDO]
DOD	Department of Defense
DPDO	Defense Property Disposal Office
EPA	Environmental Protection Agency
°F	degrees Fahrenheit
ft	foot (feet)
ft^2/day	square feet per day
gpm	gallon(s) per minute
IWTP	Industrial Wastewater Treatment Plant
lb(s)	pound(s)
mgd	million gallons per day
mg/Kg	milligrams per kilogram
mg/l	milligram(s) per liter
ml	milliliter(s)
ml/l	milliliter(s) per liter
mph	miles per hour
msl	mean sea level
NPDES	National Pollutant Discharge Elimination System

oz	ounce(s)
PCBs	polychlorinated biphenyls
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SWTP	Sanitary Wastewater Treatment Plant
TCE	trichloroethylene
TRC	Technology Repair Center
T/S/D	treatment, storage, and disposal
UXO	unexploded ordnance
VOC	volatile organic compound
<	less than
>	greater than

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

A. Introduction

1. CH2M HILL was retained by the Air Force Engineering and Services Center (AFESC) on January 26, 1981 to conduct the McClellan AFB Records Search under Contract No. F08637 80 G0010 0002.

2. The identification of hazardous waste disposal sites at military installations was directed by Defense Environmental Quality Policy Memorandum 80-6 dated June, 1980 and implemented by Air Force message dated December 2, 1980 as a positive action to ensure compliance of military installations with the Resource Conservation and Recovery Act (RCRA) and implementing regulations. The Records Search comprises Phase I of the Department of Defense Installation Restoration Program. The main purpose of the Records Search Program is to determine the potential, if any, for migration of toxic and hazardous materials off the installation boundaries.

3. The McClellan AFB Records Search Program included a detailed review of pertinent installation records, contacts with various government and private agencies for documents relevant to the Records Search effort, and an onsite base visit conducted by CH2M HILL during the week of April 27 through May 1, 1981. Activities conducted during the onsite base visit included interviews with past and present key base employees, ground tours of base facilities, and a helicopter overflight to identify past disposal areas. The installations included in the Records Search Program were

McClellan AFB, Camp Kohler Annex, Lincoln Communications Annex, Davis Communications Annex, McClellan Storage Annex, Sacramento River Dock Annex, Middle Marker Annex, and Capehart Family Housing Annex. Figures 1 and 2 give a historical summary of waste disposal practices based on the findings of the Records Search Program.

4. In the event that the Records Search indicates that the potential exists for migration of hazardous contaminants off the installation, Phase II field work would be conducted to confirm the presence of the specific migrating contaminants and to determine the extent of migration. The restoration or containment of the hazardous waste disposal sites would comprise Phase III of the Installation Restoration Program.

B. Conclusions

1. The McClellan AFB Records Search resulted in the identification of two main areas of concern:

   a. Polychlorinated biphenyls (PCBs)

   b. Trichloroethylene (TCE) ground-water contamination

2. The Arcade Water District reported water quality degradation (high total dissolved solids) in a production well located near Camp Kohler.

   No indication was found from the records or from the interviews of hazardous waste disposal or contaminant migration at the other installations included in the Records Search, i.e., Lincoln

Communications Annex, Davis Communications Annex, McClellan Storage Annex, Sacramento River Dock Annex, Middle Marker Annex, and Capehart Family Housing Annex.

C. <u>Recommendations</u>

1. Sampling, monitoring, and clean-up measures need to be implemented at the PCB-contaminated site located at the northwest corner of the runway clear zone. The possible existence of past burial pit(s) at the site (unconfirmed report from one of the interviewees) needs to be verified, e.g., by seismic survey of the area. If the existence of one or more burial pits is confirmed, then exploratory soil sampling and ground-water monitoring should be done to determine the extent, if any, of subsurface PCB contamination at the site.

2. McClellan should immediately implement an expanded monitoring program to determine the source(s) and the extent of TCE ground-water contamination. The expanded monitoring program should include:

   a. Initial geophysical logging and selected sampling of Base Wells 1, 2, 12, 18, and 28.

   b. The design of an expanded monitoring well program based on an analysis of data obtained from the initial geophysical logging and sampling effort.

   c. Routine monitoring of nearby offbase City and private wells. The offbase monitoring should be a joint cooperative effort involving

McClellan AFB, the City, the California Regional Water Quality Control Board, and the Department of Health Services.

3. The final details of the expanded monitoring program should be developed with input from the California Regional Water Quality Control Board and the U.S. Geological Survey.

4. The restoration and/or containment of the contaminant source(s) should commence as soon as sufficient information is obtained from the expanded follow-on studies to pinpoint the location(s) and extent of contaminant migration.

5. Further investigations should be conducted in cooperation with the Arcade Water District to determine the source of water quality degradation in Arcade Well No. 31. The investigations should include a detailed review of available water quality data, well logs, and well construction details for the two Camp Kohler supply wells and Arcade Wells No. 31, 16, 44, and 56.

The details are expanded and discussed in the body of the report which follows and which contains supporting data.

I. GENERAL

I. GENERAL

A. Purpose of the Records Search

The main purpose of the Records Search Program is to determine the potential, if any, for migration of toxic and hazardous materials off the McClellan Air Force Base (AFB) installation boundaries. The potential for migration of hazardous contaminants is determined by a review of existing information, including a detailed analysis of installation records. Pertinent information includes a history of operations, the geological and hydrogeological conditions which contribute to the migration of contaminants off the installation, and ecological records for evidence of environmental effects resulting from contaminants.

B. Authority

The identification of hazardous waste disposal sites at military installations was directed by Defense Environmental Quality Program Policy Memorandum 80-6 (DEQPPM 80-6) dated June 24, 1980, and implemented by Air Force message dated December 2, 1980, as a positive action to ensure compliance of military installations with the Resource Conservation and Recovery Act (RCRA) and implementing regulations.

C. Introduction

The Records Search comprises Phase I of the Department of Defense (DOD) Installation Restoration Program. If the Records Search indicates that the potential exists for migration of hazardous contaminants off the installation, then Phase II field survey work would be conducted to confirm the presence of the specific migrating contaminants and the extent of migration. The Phase II field survey would provide the data necessary to determine the magnitude of the restoration or containment required for identified hazardous waste disposal sites. The restoration or containment of the hazardous waste disposal sites comprises Phase III of the Installation Restoration Program.

The engineering firm of CH2M HILL was retained by the Air Force Engineering and Services Center (AFESC), Tyndall AFB, on January 26, 1981, to assemble a team of experts and conduct a Records Search for McClellan AFB, California. The installations included in the Records Search were McClellan AFB and several off-base sites which are supported by McClellan AFB including:

- Davis Communications Annex Transmitter Site
- Lincoln Communications Annex Receiver Site
- Capehart Family Housing Annex
- Camp Kohler Annex
- McClellan Storage Annex (adjacent to the Aerojet Industrial Complex)
- Sacramento River Dock Annex
- Middle Marker Annex

Figure 3 shows the locations of the installations included in the Records Search.

A pre-performance meeting was held at Headquarters AFESC, Tyndall AFB, Florida, on February 18 and 19, 1981. Attendees at this meeting included representatives of AFESC, Air Force Logistics Command (AFLC), McClellan AFB, and CH2M HILL, who would be participating in the Records Search. The purpose of the pre-performance meeting was to provide detailed project instructions for the Records Search, to provide clarification and technical guidance by AFESC, and to define the responsibilities of all parties participating in the McClellan AFB Records Search.

Prior to the onsite base visit, various government and private agencies were contacted for documents relevant to the Records Search effort. Appendix B contains the list of agencies contacted during the Records Search.

An onsite base visit was conducted by the CH2M HILL team from April 27 through May 1, 1981. Activities performed during the onsite base visit included a detailed search of installation records, ground and aerial tours of the installation, and interviews with former and present key base employees. The following individuals comprised the CH2M HILL Records Search team:

1. Mr. Norman Hatch, Project Manager

   M.S., Environmental Engineering, University of Florida, 1973

   M.S., Analytical Chemistry, University of Florida, 1972

   B.S., Chemistry, University of New Hampshire, 1969

2. Mr. Steven Hoffman, Assistant Project Manager

   B.S., Civil Engineering, South Dakota School of Mines and Technology, 1971

3. Mr. Gary Eichler, Hydrogeologist

   M.S., Engineering Geology, University of Florida, 1974

   B.S., Construction and Geology, Utica College of Syracuse University, 1972

4. Mr. Brian Winchester, Ecologist

   B.S., Wildlife Ecology, University of Florida, 1973

5. Mr. Jerry Aycock, Environmental Engineer

   B.S., Civil Engineering, Auburn University, 1978

Appendix C contains the resumes of the CH2M HILL participants in the McClellan AFB Records Search.

The individuals from the Air Force who participated in the McClellan AFB Records Search included the following:

1. Mr. Bernard Lindenberg (AFESC), Program Manager
2. Lt. Col. Charles Avery (AFLC), Command Chief of Environmental Planning
3. Mr. Dan Nichols (AFLC), Command Representative
4. Mr. Paul Brunner, McClellan AFB Environmental Engineer/Coordinator and Base Level Point of Contact
5. Lt. Jackie Zipfel, McClellan AFB Environmental Engineer and Base Level Point of Contact

D. Installation History

1. Location

McClellan Air Force Base, which includes 2,598 acres, is located northeast of California's capital city, Sacramento, within the heavily populated north area of Sacramento County. In addition to the 2,598 acres contained within the installation, McClellan AFB supports approximately 978 acres of property off the installation as follows:

Davis Communications Annex	316 acres
Lincoln Communications Annex	356 acres
Capehart Family Housing Annex	217 acres
Camp Kohler Annex	35 acres
McClellan Storage Annex	52 acres
Sacramento River Dock Annex	1.7 acres
Middle Marker Annex	0.3 acres

2. History [1-5][1]

McClellan AFB was established in 1936, when Congress authorized the construction of a new Air Repair Depot and

[1]References are indicated in brackets [ ].

Supply Base for the War Department. Currently, McClellan AFB is an Air Force Logistics Command Base, and the heart of the base is the Sacramento Air Logistics Center (ALC). The Sacramento ALC is responsible for the repair and modifications of assigned aircraft and also serves as System Manager for assigned aircraft, missile and space programs, electronics systems, and communications-electronics programs. Further details on the history and mission of McClellan AFB are included in Appendix D.

E. Environmental Setting

1. Meteorological Data

McClellan AFB and the surrounding Sacramento Valley have a Mediterranean-Subtropical type of climate characterized by hot, dry summers and cool, moist winters. Average temperatures of the area range from the mid-40's during winter months to the mid-70's during the summer, with an average annual temperature of approximately 60°F. Maximum daily summer temperatures frequently reach 90°F and regularly surpass 100°, while minimum winter temperatures seldom drop below 20°. Summer temperatures may vary from 25° to 40° per day, with less variation usually occurring during winter months.

Most of the precipitation falls during winter and spring months, with over one-half of the total annual rainfall occurring during December, January, and February. Of an average annual rainfall of approximately 19 inches, 17 inches is usually recorded for November through April and two inches for May through October. Snowfall is rare. The mean annual evapotranspiration rate for the Sacramento area is approximately 45 inches/year. The net precipitation for the area (mean annual precipitation - mean annual evapotranspiration) is approximately -26 inches per year.

A summary of meteorological data is presented in Table 1.

2. Biota

a. General

Three installations included in the Records Search contain significant acreages of unimproved lands: McClellan AFB (416 acres), the Lincoln site (351 acres), and the Davis site (311 acres). The predominant plant community on all of these sites, and in most of the surrounding region, is the valley grassland. Riparian forests and vernal pools also occur within or in close proximity to these sites, though their acreage is very small.

A brief field survey of fauna present on McClellan AFB was conducted on April 30, 1981. During that time, one fish, one amphibian, one reptile, two mammal, and 24 bird species were sighted. The blacktail hare is probably the largest mammal permanently residing on-base. Muskrats were also observed at a number of locations on Magpie Creek. In regard to birds, game species such as pheasant, mourning dove, and California quail are common on the site, though they are not hunted. Mallards were observed in Magpie Creek and (together with pintails) in the flooded grasslands at the Davis site.

The vertebrate fauna of Magpie Creek are limited primarily to mosquitofish, waterfowl, muskrats, and amphibians, though some of the other fish species listed in Appendix G may also be present. A study in 1973 [8] documented the macroinvertebrate fauna of the creek, with both densities and diversity being limited in the concrete-channelized portions of the creek where little natural substrate was available. Sludge worms (Tubifex) were the only species

Table 1
METEOROLOGICAL DATA FOR McCLELLAN AIR FORCE BASE
1932 - 1972

Parameter	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temperature (°F)												
Extreme maximum	75	75	80	90	100	110	115	110	110	100	85	75
Extreme minimum	20	25	25	33	35	40	45	45	40	30	25	15
Mean maximum	53.1	59.4	64.5	71.2	78.9	87.2	94.1	92.2	87.6	77.0	63.7	53.6
Mean minimum	38.2	41.5	43.2	46.8	51.8	56.8	60.4	59.8	57.5	51.1	43.8	39.5
Mean monthly	45.8	50.5	54.0	59.2	65.5	72.1	77.4	76.2	72.7	64.2	53.9	46.6
Precipitation (inches)												
Maximum	11.32	12.65	6.04	5.40	2.68	0.79	0.39	0.44	2.30	6.62	7.58	15.78
Minimum	0.57	0.16	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	Trace	0.42
Average	3.94	3.06	2.39	1.63	0.71	0.13	0.00	0.05	0.21	0.98	2.35	3.47

SOURCE: Climatic Data Records for McClellan AFB, California, from 1932-1972, Data Processing Branch, USAF ETAC, Air Weather Service/MAC.

found upstream of McClellan AFB, where the San Six Wastewater Treatment Plant provides most of the flow. Proceeding downstream, damselfly (Ischnura), Psychoda fly, and mosquito larvae become more prevalent.

Only two endangered plant species are known to occur within Sacramento County. These are Sacramento orcutt grass (Orcuttia viscida), which occurs in the vicinity of Phoenix Field, and Boggs Lake hedge hyssop (Gratiola heterosepala), which is found in the vicinity of Rio Linda [9].

Only three endangered wildlife species are expected to occur within 25 miles of McClellan AFB: the bald eagle, peregrine falcon, and giant garter snake [10]. According to Craig and Gustafson [11], the nearest eagle nest sites are near Lake Pillsbury (Mendocino County) and in the vicinity of Chico (Butte County). However, juveniles or non-breeding eagles occasionally pass through the Sacramento area. Peregrine falcons regularly migrate through Sacramento County, and it is possible some may reside there [11]. The giant garter snake is confined to sloughs, marshes, and other permanent freshwater areas, and its nearest known location is in the major riverine systems and associated wetlands south of Sacramento.

b. Environmental Stress

Most of the unimproved grassland areas on McClellan AFB have been disturbed at one time or another; much of Magpie Creek has been cleared of former riparian vegetation and channelized, and some of the vernal pool areas have been variously ditched or filled in. However, many of these actions took place in the past, and the existing vegetation growing on the unimproved areas of McClellan is generally healthy, vigorous, and supporting the appropriate fauna.

Magpie Creek has been especially impacted due both to its physical modification and the effluent from the "San Six" County Wastewater Treatment Plant located above McClellan. In 1977, a fish kill of 100 to 150 minnows took place in Magpie Creek and was ultimately traced to high chlorine residuals originating from the county treatment plant (this problem has since been corrected).

In regard to hazardous wastes, the use of persistent and later non-persistent pesticides for mosquito control onbase has undoubtedly affected the natural invertebrate fauna of Magpie Creek and the vernal pools. This impact is considered to be minor. There is no evident stress on biota due to the use and disposal of hazardous wastes at McClellan AFB. Further details on the biota of McClellan AFB are included in Appendix E.

3. Geology

a. General

McClellan AFB and the offsite facilities are all located in the Great Valley Physiographic Province, which extends from Red Bluff in the north, south approximately 400 miles to Bakersfield [14]. The valley averages 40 miles in width. The Sacramento and the San Joaquin River Valleys together form the Great Valley Physiographic Province [14]. In the McClellan area, the Sacramento Valley is further subdivided into the American Basin, the Yolo Basin, and alluvial plains of the Sacramento River [14]. McClellan AFB and the Lincoln site are located within the alluvial plain. Camp Kohler, River Dock, and the McClellan Storage Annex are located within the flood plain. The Davis site is located within the Yolo Basin.

The topography at McClellan is typical of an alluvial plain that is relatively flat. Elevations range from 75 feet above mean sea level (msl) on the east side of the base to approximately 50 feet above msl on the west side. The flat plain is dissected slightly by tributaries of the Sacramento and American Rivers. Magpie Creek is the most prominent natural drainage feature at McClellan AFB. This creek, modified somewhat by channelization, traverses the base from east to west discharging to the Natomas East Main Drainage Canal and ultimately to the Sacramento River [18].

The natural drainage patterns at McClellan AFB have been modified by construction of a series of storm drains [17]. Runoff from streets and runways is directed into this system and conveyed westward leaving the base through Magpie or Arcade Creek.

Most of the soil cover at McClellan AFB to a depth of approximately 4 feet consists of a sandy loam, referred to as San Joaquin sandy loam, undulating. The surface soil is moderately permeable, but the subsoil has a very low permeability. Surface runoff from this soil is slow to medium, and the water table is low. The soil has a low available water holding capacity and a slight erosion hazard.

In the McClellan area ground water occurs under three different conditions, i.e., confined, unconfined, and perched [14]. A confined aquifer is one in which ground water is held under pressure by overlying and underlying beds of very low or no permeability. This type of aquifer is also referred to as an artesian aquifer. An unconfined aquifer is one in which ground water possesses a free surface open to the atmosphere. The upper surface of ground water under this condition is called the water table. A perched condition occurs when ground water is held above the regional water table by an impermeable layer separating it from the saturated materials below. The unconfined and perched occurrence are unimportant to water supply but of some significance with regard to pollutant migration. The surface soils and sediments to a depth of approximately 75 feet below land surface (bls) consisting of dense interbedded sand, silt, and clay with lenses of metamorphic channel gravel are part of the Victor Formation. This formation is moderately permeable throughout and highly permeable where old stream channels are encountered. Generally, it yields little water except where old channels are present. Some domestic and shallow irrigation wells are completed within this formation [14, 15].

Water supply wells are completed within the deeper strata and generally withdraw water from the Fair Oaks and Mehrten Formations. The wells at McClellan are generally completed such that they withdraw water from the bottom of the Fair Oaks and top of the Mehrten Formations [19, 20, 21, 22, 23].

Ground-water quality in the McClellan AFB vicinity is excellent for irrigation and domestic use [14, 15, 16, 24]. The chemical characteristics of this ground water are reflective of its origin, containing calcium, magnesium, and calcium-sodium bicarbonate. In Sacramento County, fresh ground water ranges in thickness from several hundred feet near the eastern portion of the county to an estimated 2,000 feet near the Sacramento River. The thickness of freshwater at McClellan AFB is approximately 1,385 feet [14].

b. Geologic Aspects of Potential Migration

At McClellan AFB, there are several geologic factors which affect the potential for migration of pollutants offbase.

The base has relatively low relief and therefore runoff rates are also fairly low. This factor affects the infiltration rate causing it to be fairly high. The upper soils are fairly permeable down to the hardpan. The hardpan, a clayey layer is fairly impermeable; however, below the hardpan soils become fairly permeable again. In those areas where the hardpan has been breached, infiltration into the underlying strata is increased. The production zone for water supply wells begins at approximately 100 feet below land surface. The strata occurring above the production zone consist of alternating layers of sand, silt, and clay of varying permeability. In those areas where the upper strata is predominantly sand with some clay and silt the leakage rates to the production zone is increased.

In the vicinity of production wells the drawdown at the pumped well results in the highest head differential between the upper strata (possible source of contamination) and the production zone. The driving force, therefore, between the upper strata and the production zone is highest in the vicinity of the production wells. Two pollutant paths are possible whereby contamination occurring in the upper strata could enter the production zone.

The first is infiltration and leakage through the upper strata into the production zone. This is especially critical where the overlying strata are permeable due to a lack of clay and where the hardpan has been breached. Another contributing factor to this method of pollutant travel is screening of shallow, permeable zones in the production zone. In some of the production wells, perforation begins as shallow as 100 feet (Well No. 2). This upper or first permeable zone is the first strata to be contaminated and may be the only contaminated zone. Wells which tap these shallower zones and occur in areas where contamination potential is high are more likely to be contaminated by surface sources.

The second contamination path is vertical movement of pollutants from a shallow source which has moved horizontally through the upper strata down the annular space between the casings or casing and hole. This is a common source of pollution and is related to past well construction practices whereby no seal or an inadequate seal is provided for.

Pollution of an old abandoned well, No. 7, if improperly plugged could be a continuing conduit from some surfacial source to the production zone.

A third probability for pollution migration is a combination of the two methods listed above. That is, contaminants could infiltrate and leak into the shallowest production zone such as the 100 to 112 foot strata screened in Well No. 2. Once this zone is contaminated pollutants could travel horizontally to Production Well No. 2 or others producing from this strata, and move vertically down the well gravel pack into lower producing zones thus contaminating them also.

Another contributing factor to the movement of pollutants horizontally is increased pumpage for water. The travel time of a particular pollutant once in the production zone is dependent on the permeability of the strata, and the hydraulic gradient. As pumping from a particular area such as the city wells located southwest of the base or irrigation wells located northwest of the base increases, the hydraulic gradient also increase toward the center of pumping. The higher the gradient the less the travel time of a pollutant.

Further details on the geology of the McClellan AFB area are included in Appendix H.

F. Leases

The outgrant and ingrant arrangements by McClellan AFB are recorded in four categories: lease, permit, license, and easement. Outgrants involve the use of McClellan AFB property by others, and ingrants involve the use of other property by McClellan AFB. The records search documented the current grantees and/or grantors, their purpose, and type of agreement. There are currently 47 outgrants and 73 ingrants [27]. Review of these records indicates that none of the present grants involves activities that could result in the release of any contaminants potentially hazardous to the environment.

Discussions with McClellan real estate personnel indicated that no significantly different types of grants or purposes existed in the past [28]. Therefore, there is no reason to believe from this information, that in- and outgrant activities of the past could result in the release of any potentially hazardous contaminants.

G. Legal Actions

Documentation was found of a present claim against McClellan AFB and others regarding PCB contamination [29].

An employee of Billington Motor and Armature Works of Rancho Cordova, California, has filed a suit against Monsanto

Corporation, Leon Billington, and Billington Motor and Armature Works, alledging adverse health symptoms as a result of being in contact with oil containing PCBs. The PCBs are alledged to have come from air-field lighting regulators which Billington has been repairing for McClellan AFB since 1976. The Billington employee has also filed a claim against McClellan AFB and is expected to include McClellan AFB in the lawsuit.

Another contractor, Tayco Industries, was identified as having performed repair work on Air Force transformers containing PCBs. Soil samples were taken at the Tayco site to determine if PCBs had accumulated in the underlying soils. Water samples from a well located on the Tayco site were also collected and tested for PCBs. The tests failed to show significant quantities of PCBs from the soil or water samples taken at the site. PCBs stored in barrels at the site were subsequently removed and disposed of at an EPA-approved PCB disposal site.

II. PAST AND CURRENT ACTIVITY REVIEW

II. PAST AND CURRENT ACTIVITY REVIEW

A. Installation Operations

1. Industrial Operations

a. General

McClellan AFB is one of five Air Force Logistics Command depots located in strategic areas of the United States. The base provides support to the Air Force's operational commands in the areas of management, procurement, maintenance, repair, overhaul, supply, distribution, and transportation of Air Force assigned aircraft, parts, and component systems. A wide variety of industrial operations are conducted at McClellan AFB. In general, maintenance and repair operations are located at the eastern portion of the base, while storage and distribution facilities are located at the southwest portion of the base. A complete list of facilities involved in industrial type activities, including maintenance and repair facilities and warehouse facilities, is given in Appendix I. Individual spill plans have been developed for all of these facilities to prevent accidental chemical spills from migrating off the base.

b. Major Industrial Activities [30-33]

In general, the wastes generated from the various industrial operations are handled in one of the following manners, depending on the waste type, toxicity, and potential for reuse or resale.

(1) Drained to the industrial sewer.

(2) Containerized and sent to the base hazardous waste storage Facility 1086 to await proper contractor disposal.

(3) Containerized and sent to the Defense Property Disposal Office (DPDO) for resale or proper disposal.

(4) Sent to the contaminated fuel storage tank located at Apron 7905 for sale to a contractor who reprocesses the fuel as a heating fuel supplement.

(5) Collected in bowsers or storage tanks and transported to the Facility A-B Oil Skimmer/Storage Tank located at the industrial wastewater treatment plant.

(6) Containerized and sent to the solvent recovery facility for reclamation and reuse.

The locations of RCRA registered hazardous waste treatment, storage, and disposal facilities at McClellan AFB are shown on Figure 20. The RCRA Hazardous Waste Permit application is included in Appendix O.

The major industrial activities conducted at McClellan AFB are summarized in the following paragraphs. Details of the waste types, quantities, and final disposition for the major industrial activities are given in the "McClellan AFB Hazardous Waste System Evaluation," which is included in Appendix J. The locations of the major industrial facilities at McClellan AFB are shown on Figure 21.

The plating shop, located in Building 243G, is capable of performing a wide variety of electroplating operations including chromium, cadmium, nickel, copper, silver, gold, and lead plating; alkaline and caustic cleaning; vapor degreasing; chemical milling; phosphate coating; chromium, sulfuric, and phosphorus anodizing; and other plating-related processes. Waste products generated from the plating shop are, depending on the type of waste, sent to the industrial wastewater treatment plant after pretreatment at the plating shop, containerized and sent to the DPDO for sale or contractor disposal or containerized and sent to the hazardous waste storage Facility 1086 to await proper contractor disposal.

Depainting and F-111 fuel tank desealing operations are conducted at the Building 375 washrack. The desealing process is a contract operation using a proprietary product known as SR 51 which contains thiophenol, pyrrolidine, triethyl phosphate, and naptha. Waste solution is containerized and taken off-site for proper disposal by the contractor. Final rinse water goes to the industrial sewer. The aircraft depainting operation uses a variety of phenolic and nonphenolic paint strippers. Wastewater goes to the industrial sewer.

An aircraft paint hangar, located in Building 692, is used primarily for painting of aircraft and large aircraft parts. Other activities include final aircraft prepainting or solvent wash and, occasionally, aircraft depainting. Mixed paint and paint cleaning waste is contain erized and sent to the hazardous waste storage Facility 1086 to await proper contractor disposal.

Jet engine test cells are located in Building 431 for the evaluation and optimization of jet engine performance. Wastewater, primary cooling water, goes to the industrial sewer.

Painting of vehicles and aircraft parts is done at Building 655. Waste paints and solvents are contain-erized and sent to the hazardous waste storage Facility 1086 to await proper contractor disposal.

Flight preparation operations are conducted at Aprons 7807, 7808, and 7620. Waste fuel, engine oil, and solvent are collected in drip pans and then deposited in bowsers. The bowsers are taken to the Facility 346 A-B Oil

Skimmer/Storage Tank at the industrial wastewater treatment plant or to the contaminated fuel storage tank located at Apron 7905. The contaminated fuel is sold to a contractor for reprocessing as a heating fuel supplement.

Operational jet engine run-up tests are conducted in Buildings 632 and 633. Wastewater, primarily cooling water, goes to the industrial sewer.

Aircraft maintenance operations are conducted in Buildings 362, 365, 360, and 251. Waste hydraulic fluid, engine oil, and Stoddard solvent are segregated, containerized, and sent to the DPDO for resale.

Aircraft fuel testing and tank purging operations are conducted at Apron 7905. Purging of JP-4 from aircraft fuel tanks is done with either Phillips Soltrol 200 or a mixture of JP-5 and 10/10 oil. Used JP-4, Soltrol 200, and JP-5 are sent to a 15,000-gallon contaminated fuel storage tank. The contaminated fuel is sold to a contractor for reprocessing as a heating fuel supplement.

Jet engine repair work is done at Building 475 F. Contaminated JP-4 fuel, hydraulic fluid, and solvents are segregated, containerized, and sent to the DPDO for resale.

A tube and cable shop operation is located in Building 362. Waste tetrachloroethylene degreasing solvent is containerized and sent to the DPDO for resale or proper disposal.

A pneudraulic repair shop is located in Building 243 A. Waste Stoddard solvent is containerized and sent to the DPDO for resale or reclaimed on-base using the solvent recovery still.

The instrument repair shop operates a painting and cleaning facility at the southwest side of Building 252 and 250 M-H. Waste tetrachloroethylene cleaning solvent is containerized and sent to the DPDO for resale.

A hydraulic pump and motor repair shop is located in Building 251. Overhaul operations include degreasing, paint spraying, and solvent spraying. Waste hydraulic fluid and trichloroethane solvent are containerized and sent to the DPDO for resale.

Building 351 has a solvent spray booth operation and a tank degreaser operation for the cleaning of equipment parts. Waste tetrachloroethylene solvent is containerized and sent to the hazardous waste storage Facility 1086 or DPDO to await proper disposal.

A paint spray booth operation is located in Building 473C for parts, equipment, and barrel painting. Waste paints and thinners are containerized and sent to the hazardous waste storage Facility 1086 to await proper disposal.

An electronics repair shop operation, located in Building 640, includes a solvent spray booth and soap cleaning operation and a paint spray booth operation. Waste solvent and paint residue are collected in a 500-gallon storage tank and then transferred to a bowser for delivery to the Facility 346 A-B Oil Skimmer/Storage Tank at the industrial wastewater treatment plant. Soap cleaning waste-water goes to the industrial sewer. Waste oils are collected in a 1,000-gallon bowser and then transferred to the Facility 346 A-B Oil Skimmer/Storage Tank.

The bomb scoring direction section operates a parts cleaning facility in Building 1093. Degreaser sludge, paint residue, and spent solvent are collected in a 1,000-gallon holding tank and transferred to the industrial wastewater treatment plant.

The bonded panel unit in Building 243 F operates a freon vapor degreasing operation. Waste solvent is containerized and sent to the DPDO for resale or contractor disposal.

The plastics unit operates a depainting facility in Building 243 E. Waste paint remover and paint residue are containerized and sent to the hazardous waste storage Facility 1086 to await proper contractor disposal.

A machining and grinding operation is located in Building 243 B. Waste coolant and honing oil are containerized and sent to the DPDO for resale or contractor disposal.

The bearing unit operates a bearing carbon removal process in Building 440. Waste cleaning agent is containerized and sent to the DPDO for resale or contractor disposal.

The cleaning and corrosion unit located in Building 243 D has several industrial operations, including depainting, aluminum process pretreating, magnesium process pretreating, metal parts cleaning, dichromate magnesium treatment, painting, and vapor degreasing using tetrachloroethylene. Process wastes, depending on their type, are sent to the industrial sewer, containerized and sent to the DPDO for resale or contractor disposal, or containerized and sent to the hazardous waste storage Facility 1086.

The screw actuator/landing gear unit operates an aircraft components cleaning operation in Building 351. Waste dry cleaning solvent, hydraulic fluid, and freon are segregated, containerized, and sent to the DPDO for resale or contractor disposal.

An oil cooled generator repair operation is located in Building 243 F. Waste soap cleaning solutions, hydraulic fluid, and lube oil go to the industrial sewer. Waste cleaning solvents are containerized and sent to the DPDO for resale or contractor disposal.

A special equipment repair center is located in Building 310 for the onsite repair of automative equipment using cleaning solvents and automotive maintenance products. Waste oil is containerized and sent to the DPDO for resale. Spent Stoddard solvent is containerized and sent to the solvent recovery still for reclamation.

A general purpose vehicle repair center is located in Building 411 for the repair of automotive equipment using cleaning solvents, automotive maintenance products, and vehicle painting (depainting operations). Waste oil and hydraulic fluid are containerized and sent to the DPDO for resale. Waste paint residues and thinners are sent to the Facility 346 A-B Oil Skimmer/Storage Tank at the industrial wastewater treatment plant.

A fuel tanker servicing operation is located at Building 655 for the repair and maintenance of fuel tanker trucks. Waste oil and contaminated fuel are sent to the Facility 346 A-B Oil Skimmer/Storage Tank.

c. Cooling Towers

There are 46 cooling towers operating at McClellan AFB, primarily in conjunction with the air conditioning of work areas. The majority of the cooling towers are located in the east-central portion of the base. Cooling tower blow-down has been discharged periodically to the industrial sewer.

d. Steam Plants

There are three major steam plants and 19 minor steam plants to provide heating and process steam requirements throughout the base. Boiler blow-down has been discharged periodically to the industrial sewer.

e. Fuel Handling

Eight liquid petroleum products are stored in 33 tanks ranging in size from 5,000 gallons to 640,000 gallons, with a total capacity of about 2.75 million gallons. These fuel, oil, and cleaner products are pumped into tank trucks for delivery to all parts of the base. An annual leak test program is conducted on all petroleum product storage tanks. In general, the tanks are well maintained, the soils are non-corrosive, and tank leaks have not been a major problem in the past. All fuel transport pipelines are pressure checked for leaks on a regularly scheduled basis. Some minor leaks are present in the 10/10 oil line at Apron 7905; however, this line is scheduled to be replaced in the near future. The installation records review and the interviews indicated that only one major fuel leak has occurred in the past. This occurred at Tank Farm 7 when a contractor left a tank valve open, resulting in a spill of about 4,000 gallons of JP-4. The spill was contained in the diked area surrounding the tank. Fuel tank desludging has been done by base personnel since 1979. The sludge is transported to the industrial wastewater treatment plant. Prior to 1979, fuel tank desludging was handled by a contractor who hauled the sludge offsite for disposal.

f. Historical Industrial Operations

The interviews of past and present key base employees resulted in the identification of several past major industrial operations at McClellan AFB (located on Figure 22).

Plating shop operations were conducted in Building 251 prior to 1946; in Building 343 from 1946 to 1958; and in Building 666 from 1958 to 1980. Plating shop operations are currently conducted in Building 243 G. Building 343 had some wastewater pretreatment facilities including chromium and cadmium recovery and residual chromium reduction. Pretreated wastewater was then discharged to the old industrial wastewater treatment plant for additional treatment, including lime neutralization, dissolved air flotation, chromium reduction with ferrous sulfate, and alum coagulation prior to final discharge to Magpie Creek. Building 666 had extensive wastewater pretreatment facilities including cyanide oxidation, heavy metals precipitation, and chromium recovery. Pretreated wastewater was discharged to the old industrial wastewater treatment plant until 1972, when the next treatment plant was constructed. The new treatment plant provided more extensive final treatment including neutralization, heavy metals precipitation, chromium reduction, biological treatment, chlorine dioxide oxidation of phenols, and flow equalization. A more detailed discussion of the industrial wastewater treatment plant operations is presented in Section II B.1.b. The new plating shop located in Building 243 G also has extensive wastewater pretreatment facilities, including cyanide oxidation, neutralization, and chromium reduction.

A large aircraft reciprocating engine repair shop operation was conducted in Building 475 from about 1942 until the late 1950's. Building 475 is the current jet engine repair shop. The old engine repair shop had an extensive carbon removal operation in which a dichlorobenzene and cresylic acid solvent mixture was used in large quantities to remove carbon deposits from aircraft engines. According to the interviews, the solvents were stored in two 90,000-gallon tanks, one above ground and one below ground. A tank valve was left open in 1954, resulting in a cresylic acid spill which contaminated the City of Sacramento's water treatment plant intake, located on the Sacramento River, for a short period of time. Ethylene dichoride solvent was used prior to dichlorobenzene in the carbon removal operation. Wastewater from the Building 475 operations was sent to a pretreatment facility, no longer in existence, prior to discharge to the sanitary sewer system.

There have been a variety of industrial operations in Building 251 in the past. As discussed previously, the first plating shop operation was located in Building 251. A large general shop was located in Building 251 until the late 1960's, which included a hydraulics shop and a foundry operation. Painting operations were also conducted in Building 251 in the early 1940's. In addition, a radium paint and depaint operation at the instrument shop was located at the southeast corner of Building 251. Low level radioactive waste from the radium paint operation was containerized in drums with concrete and hauled offsite.

The aircraft painting operation currently located in Building 692 was located in Building 362 A in the past.

g. Solvent Recovery Operations

A current solvent still recovery operation is conducted in Building 477 for the recovery of Stoddard solvents. According to the interviews, a small acetone recovery still was operated behind Building 351 in the late 1950's. The operation was short-term and lasted only about 1 year. The still was also used to recover trichloroethylene (TCE) for a short period of time (approximately 3 months). The old aircraft reciprocating engine repair shop operation in Building 475 had a countercurrent solvent extraction process for the recovery of cresylic acid and dichlorobenzene. None of the interviewees reported any knowledge of past major TCE solvent recovery operations at McClellan AFB.

h. Degreasing Operations

The earliest degreasing operations at McClellan AFB were spray or dip operations using primarily Stoddard solvent and sometimes carbon tetrachloride. The use of carbon tetrachloride was restricted in 1949 and completely phased out by the mid-1970's.

The first vapor degreaser using trichloroethylene (TCE) was installed in the old plating shop (Building 251) in 1942. The vapor degreaser reservoir held from 20 to 50 gallons of TCE. The vapor was condensed and returned to the reservoir; each vapor degreaser had its own internal recovery system. Sludge, consisting primarily of hydrocarbon residue with some TCE, was periodically removed from the bottom of the reservoir and containerized for disposal. By 1949, there were about 15 vapor degreasers using TCE in operation in the plating shop, which by that time had been moved to Building 343. At their peak, there were from 20 to 30 TCE vapor degreasers in operation at McClellan AFB, and total TCE usage in degreasing operations probably never exceeded 1,000 gallons at one time over the entire base. The use of TCE in vapor degreasers has been replaced by tetrachloroethylene and freon. TCE was also used as a common wipe solvent in the past in maintenance and repair shops throughout the base.

2. Lessee Industrial Operations

There are numerous host-tenant agreements between the host Air Logistics Center (ALC) and the many tenant units operating at McClellan AFB, in which ALC provides support services for the tenant units such as wastewater treatment, refuse collection, fire protection, etc. However, a review of existing McClellan AFB inleases and outgrants, which include leases, agreements, licenses, permits, and easements, indicates that there are no existing lessee industrial operations at McClellan AFB.

Building 2008 at the McClellan Storage Annex is leased to Aerojet Services Company as office space. There are no industrial operations conducted in this building.

There is also a permit in effect with the Defense Logistics Agency (DLA) operation located at McClellan AFB. The DLA operation is involved with the temporary storage and resale of excess military property and is not involved in any industrial-type activity.

The F-111 fuel tank resealing operation at Building 375 is a contract operation. However, all facilities are owned by McClellan AFB and there are no leases or permits involved in this operation.

3. Laboratory Operations

There are numerous laboratory operations at McClellan AFB, including fourteen technical laboratories, two non-destructive instrument testing laboratories, two depot quality control laboratories, six precision measurement equipment laboratories, and a base photographic processing laboratory. An inventory of existing laboratory facilities is given below [34]:

Building Number	Laboratory Type	Year Completed
240	Non-Destructive Instrument Testing Lab	1957
243	Non-Destructive Instrument Testing Lab	1975
351	Precision Measurement Equipment Lab	1943
252	Precision Measurement Equipment Lab	1938
473	Precision Measurement Equipment Lab	1942
626	Precision Measurement Equipment Lab	1946
676	Precision Measurement Equipment Lab	1970
677	Precision Measurement Equipment Lab	1974
368	Depot Quality Control Lab (Physical Science Lab)	1963
243G	Depot Quality Control Lab (Physical Science Lab)	1944
334	Technical Lab (Civil Engineering Lab)	1942
628	Technical Lab (1155th Technical Squadron Central Laboratories)	1959
629	Technical Lab (1155th Technical Squadron)	1957
631	Technical Lab	1968
642	Technical Lab	1966
646	Technical Lab	1970
350	Technical Lab	1943
351	Technical Lab	1953
615	Technical Lab	1965
1046	Technical Lab	1956
4000	Technical Lab (1155th Technical Squadron Lab at Camp Kohler)	1955
4004	Technical Lab	1972
4006	Technical Lab	1972
4008	Technical Lab	1972
336	Base Photo Lab	1942

Of the above facilities, the major laboratory operations which handle a diverse variety of laboratory chemicals include:

a. Physical Science Laboratory--Building 368

b. 1155th Technical Squadron Central Laboratory-Building 628

c. Civil Engineering Laboratory--Building 334

d. Base Photo Lab--Building 336

The Physical Science Laboratory provides quality control and analytical support for industrial operations on-base, including the plating shop, engine repair shop, paint shop, fuels testing, and materials testing. Small quantities of spent testing solutions are discarded to the industrial sewer system. Large samples of plating solutions and petroleum products are, generally, sent back to the shop or tank where the sample came from. Excess chemicals, and chemicals which have exceeded their shelf life, are sent to the Defense Property Disposal Office (DPDO) for disposal.

The 1155th Technical Squadron Central Laboratory performs a wide range of laboratory analyses, gas analyses, applied physics-related analyses, and radiation analyses. This laboratory is a classified research area. Small quantities of nonradioactive spent testing solutions are discarded to the industrial sewer system, including small quantities of acids, bases, benzene, carbon tetrachloride, and other organic solvents. Low level radioactive wastes, including contaminated paper, gloves, broken glassware, etc., are sent off-base to low level radioactive material disposal sites, including 70 to 80 55-gallon drums per year. These disposal activities are coordinated by the base Bioenvironmental Engineering Department and an organizational radiation protection officer. The 1155th also has a trace analysis laboratory for water samples in Building 646 and an off-base laboratory in Building 4000 located at Camp Kohler. Interviews with 1155th Technical Squadron personnel indicated that, in the past, small quantities of solvents were disposed of on the ground near the railroad tracks outside Building 628 as follows:

Chemical	Amount	Date
Freon	~100 gallons/year	1960 - 1980
Ethyl Ether	~2 quarts/year	1976 - 1979

Little, if any, trichloroethane (TCE) was disposed of at the above railroad track area. However, some TCE (approximately 100 gallons per year) was apparently used for cleaning and was allowed to spill on the paved surface near Building 629 during 1960 to 1961. From 1961 to 1975, approximately two gallons per year of TCE were used as a degreaser and allowed to spill on the paved surface. Also, small quantities of radiac wash, with very low levels of radiation, were used in the past to wash down sample containers, with approximately 5 to 10 gallons per year allowed to spill in the paved yard.

The 1155th has also operated a laboratory at Building 4000 at Camp Kohler since 1969. According to interviews, small quantities of TCE (about 12 gallons per year) were disposed of to the sanitary sewer drain from 1972 to 1975. Since 1975, all wastes generated at this laboratory have been collected in a waste tank and sent to McClellan AFB for treatment and disposal. The 1155th is planning to move a new laboratory operation to Camp Kohler in the near future; no liquid wastes will be generated from this new operation.

Outdated chemicals from the 1155th laboratory are sent to DPDO for proper disposal; the Base Civil Engineer assumes responsibility for the proper handling and storage of outdated chemicals. Guidance for disposal is provided by the Bioenvironmental Engineering Department.

The Civil Engineering Laboratory (Building 334) is responsible for process control and analytical support for the sanitary and industrial wastewater treatment plants, and for water quality testing as required in pollution abatement activities at the base. Spent laboratory samples, including small quantities of chloroform used in phenol analyses, and spent acids and bases, are disposed of to the sanitary sewer system. Spent chemical oxygen demand (COD) test solutions, which contain small quantities of mercuric sulfate, are saved for mercury reclamation. Outdated chemicals are sent to DPDO for resale, if appropriate, or sent to the hazardous waste storage area for proper disposal.

The Photographic Processing Lab (Building 336) uses standard photographic processing solutions. Spent solutions are processed to recover silver content and then discarded to the sanitary sewer system. Waste film is sent to the DPDO for proper disposal.

The Precision Equipment Calibration labs are basically dry processes with only small quantities of solvents used for cleaning. Spent solvents are collected and reclaimed on base, if feasible, or disposed of through DPDO or base civil engineering, as appropriate.

The Non-destructive Testing labs (Buildings 240 and 243) use x-ray test equipment and perform x-ray film developing. Spent chemicals processed for silver recovery are then disposed of to the sanitary sewer system. In addition, Building 243 uses oil, emulsifier, and penetrant associated with the Magnaflex Inspection Operations. Spent oil and chemicals are collected and reclaimed, if feasible. or disposed of through the DPDO or base Civil Engineering, as appropriate.

The remaining technical laboratories are small operations with minimal chemical usage, clean spaces used for the repair and maintenance of sensitive electronic equipment, or storage areas for chemicals and equipment used in the central laboratories.

4. Training Areas

Training operations conducted at McClellan AFB are primarily for proficiency purposes. The two major training operations conducted on-base are:

a. Small firearms training

b. Fire-fighting training

In the past, fire training was conducted at a main training ground or at burning pits used for the disposal of waste (mostly refuse). In the middle 1970's, a small ditch was excavated along Taxiway 12 in order to practice fire-fighting training. The materials burned and the chemicals used (if any) to extinquish the fire are unknown.

Fire-fighting agents used at McClellan AFB are:

- Aqueous Film Forming Foam
- Protein foam (has not been used for several years)
- Chlorobromomethane
- Halon-1211
- Ansul-dry chemical
- Jetex (foaming agent--mostly for structures)

Since 1976 through 1977, fire training has been conducted in a main training area on the west side of the base. Runoff is collected in a small holding area for final treatment and disposal. Another fire training drill ground used in the late 1960's was near Building 431. Prior to that, the drill site was located near Building 1093 in what is now a parking lot. At all old drill sites, no waste collection was practiced; therefore, waste that did not runoff evaporated and/or percolated into the ground.

5. Toxic/Hazardous Materials--Handling and Storage

a. Industrial Chemicals

i. General

The primary area for storage and distribution of industrial chemicals is Building 781, which is one of the most modern chemical warehouse facilities in the Air Force. Industrial chemicals, including acids, alkalies, gases, oils, cleaners, solvents, paints, and plating chemicals are delivered from Building 781 to about 24 user areas on base.

Good chemical management and a comprehensive spill control and correction plan for all chemical storage facilities, minimizes the potential of major chemical spills from migrating off the installation boundaries. A review of installation records indicated the following chemical spill accidents since 1976 [35]:

Date	Material Spilled
February 18, 1976	Mercury (1.2 oz)
February 21, 1976	JP-4 and JP-5 fuel (200 gallons)
March 3, 1976	JP-4 fuel (300 gallons)
	Mogas fuel (600 gallons)
June 24, 1976	Mineral oil (10 gallons)
June 24, 1976	Nickel sulfate solution (110 gallons)
October 11, 1976	Fuel spill (50-200 gallons)
October 16, 1976	Fuel spill (50-100 gallons)
November 8, 1976	SR 51 desealer
January 5, 1977	Hydrofluoric acid (50 gallons)
January 10, 1977	Oil spill (30-50 gallons)
February 23, 1977	Fuel spill (250 gallons)
April 15, 1977	Phenolic cleaning compound (25 gallons)
May 11, 1977	Hydraulic fluid (80 gallons)
May 20, 1977	Diesel fuel
June 15, 1977	Turco 535, paint remover (2 gallons)
March 6, 1978	Paint residue and thinners
April 21, 1978	SR51 desealer (1,200 gallons)
July 12, 1978	JP-4 fuel (5-10 gallons)
July 12, 1978	SR51 desealer (25 gallons)
May 22, 1979	Paint remover (55 gallons)
September 5, 1979	Nitric and perchloric acid (400 lbs)
October 24, 1979	PCB (200 gallons)
November 5, 1979	Sodium dichromate
March 4, 1980	Mercury
November 18, 1980	Potassium cyanide

The above spills were contained and recovered or neutralized with no indication of contaminant migration off the base.

ii. Polychlorinated Biphenyl (PCB) Storage

(a) Introduction

Polychlorinated biphenyls (PCBs) are among the most chemically and thermally stable organic compounds known to man. They include a family of chemicals that have been known to chemists since 1881 and were first commercially available in the United States in 1929. PCBs were extensively used in this country, primarily in electrical transformers and capacitors. Other uses included hydraulic fluids, cutting oils, plasticizers, carbon copying paper, and dust control fluids. PCB waste is accumulated at McClellan AFB as a result of its mission as a depot maintenance, repair and storage center for communication and electronic equipment.

Until the mid-1960's, PCBs were considered nontoxic; however, further testing demonstrated that PCBs were high risk chronic toxicants. Current knowledge indicates that PCBs accumulate in animal fatty organs and tissues, especially in fish and poultry, and they can cause human liver and kidney damage through ingestion or direct contact. Because of their stability, PCBs , once introduced into the environment, persist for long periods of time and are not readily destroyed.

In 1966, PCBs were identified as widespread environmental contaminants; and Congressional action in 1976 banned the further manufacture of PCBs. On May 31, 1979, strict Federal regulations were promulgated which strictly regulated the disposal of PCB wastes; and prohibited the processing, manufacturing and distribution of PCBs after July 1, 1979.

iii. Existing PCB Storage Areas at McClellan

PCB contaminated items are securely stored at several locations throughout the base. As of September 1980, the PCB inventory at McClellan was as follows:

Liquid PCB in storage	23,000 gallons
Liquid PCB in service	7,800 gallons
PCB contaminated solid waste in storage	5,000 gallons

Estimated PCB waste liquid generation is about 3,000 gallons per year. A description of the PCB storage areas is given in the following paragraphs.

Building 624C/D is the main storage area for out-of-service transformers and capacitors containing PCB, and drums containing PCB contaminated material. The storage area has a concrete floor and Stockroom "D" has a bermed area for additional protection in case of spills. Stockroom "C" is used to store less hazardous PCB contaminated items. Both stockrooms are separated from each other and adjoining stockrooms by concrete firewalls. Both stockrooms have concrete floors with no floor drains.

A civil engineering storage area is located in Building 636 for bulk storage of PCB liquid in drums. The storage area has a concrete floor with berms and no floor drains. As of January 1981, approximately eighty-five 55-gallon drums of PCB liquid were stored in Building 636.

Building 655, the radar van repair shop, has a transformer and a semi-conductor device containing about 70 gallons of PCB. Building 640, an electronics repair shop, has 20 capacitors each containing about 1 pint of PCB liquid. All of the above items are stored on concrete floors away from floor drains.

In addition to the above PCB items in storage, there are over 30 PCB-containing transformers in use throughout the base.

Spill control and correction plans have been developed to contain and recover PCB spills should they occur; and to prevent PCB spill migration off the base. Containment and clean-up procedures include dams to prevent spills from entering drains or drainage ditches, and imbiber beads to absorb spilled PCB material.

A review of installation records and interviews with past and present key base employees indicated only one past major PCB spill on base. The spill occurred on October 24, 1979, in Building 624C and involved approximately 200 gallons of PCBs which leaked from a broken transformer valve. The spill was properly contained and recovered with no migration of PCB material off the base. Several minor transformer leaks and "seepage" have also occurred in the past.

iv. PCB Disposal

No indication was found of the past disposal of PCB material in onsite base landfills. As of October 1980, accountability for the disposal of excess PCBs and PCB items has been transferred to the Defense Property Disposal Office [36]. The DPDO has developed a plan for disposal of PCB items by a service contract which will include draining, carcass rinsing, and drumming of fluid from items containing over 500 parts per million (ppm) of PCBs. Transformer carcasses and other PCB contaminated items containing 50 to 500 ppm of PCB will be sent to approved EPA landfills for disposal. Containerized fluid containing over 500 parts per million of PCBs will remain in safe storage until a suitable offbase disposal site is found. At the present time, high temperature incineration is the only EPA approved method for disposal of high level PCB items. All transformers used or stored onbase are tested to determine if they contain PCB liquid. Transformers and other items found to contain PCBs are properly marked with a regulation hazardous warning label.

v. Past PCB Disposal

In 1976, McClellan recognized the problems associated with PCBs and began a program to control its use, handling, storage, and disposal. Prior to 1976, PCB containing transformers and other items were stored at various locations throughout the base. The normal method for disposal of transformers, some of which contained PCBs in the past was through the DPDO for resale. During fiscal years 1976 and 1977, a total of 32 PCB containing transformers were sold by the DPDO [37]. No record was found to indicate the number of used transformers sold by the DPDO prior to 1976.

McClellan had planned, until recently, to dispose of its waste PCB liquids by incineration in the liquid waste incinerator located at the industrial wastewater treatment plant site [38]. However, permission for a PCB test burn to demonstrate the viability and safety of this disposal method was not granted by the state, and McClellan is no longer pursuing onsite incineration as a PCB disposal option.

vi. PCB Contamination in McClellan Wastewater Discharges

In 1977, McClellan detected what appeared to be PCBs in the cooling water discharge from the liquid waste incinerator. A follow-up sampling program by McClellan indicated that the desealing operation at Building 375 was the primary source of the "suspect PCBs." The EPA Region IX was notified of the test results, and an EPA field surveillance team visited the base in July 1977 to conduct a special PCB sampling program [39]. Samples collected and analyzed by the EPA included the following:

- o Water samples including Magpie Creek, Arcade Creek, washrack operations from Building 375, treated sanitary wastewater and treated industrial wastewater.

- o Sediment samples including Magpie Creek, Second Creek, Arcade Creek, Dry Creek below the Roseville Sewage Treatment Plant, and the East Natomas Drainage Canal.

- o Industrial waste sludge.

Initial test results indicated the presence of PCBs; however, subsequent confirmation tests indicated that PCBs were not present in any of the above samples. The test results did indicate, however, that several toxic compounds other than PCBs were present in Building 375 washrack discharge. Subsequent bioassay tests on fish indicated that the industrial wastewater treatment plant was effectively treating these toxic compounds. To provide additional assurance, desealing and alkaline rinse material was no longer allowed to discharge to the industrial wastewater treatment plant; and was containerized and sent back to the manufacturer for reuse. The final rinsewater discharge was also reduced by 75 percent.

vii. <u>Offsite Spill and Clean-Up Incidents</u>

Two incidents including the spill and subsequent cleanup of McClellan PCB material at offsite locations are described in Section I.G., "Legal Actions."

PCB contamination has also been discovered at a site recently purchased by McClellan and located at the northwest corner of the clear zone--details are discussed in Section II.B.2.b., "Contaminated Area."

b. Chemical Agents and Pesticides

No record or indication of the manufacture, storage, use, or disposal of military chemical agents was found at McClellan AFB. No record or indication was found of problems related to pesticide storage or spills.

Civil Engineering (CE) Entomology personnel are responsible for the management and dispersion of chemical agents for pest and weed control. The pest management program at McClellan AFB is based on U.S. Federal laws and applicable county and State requirements. A general listing of the pesticides and herbicides used at McClellan AFB is given in Appendix K.

All aspects of mosquito control are coordinated with local county mosquito abatement programs. Larval mosquito control is accomplished by using a combination of mosquito fish (gambusia) in creeks and lakes and Dursban insecticide in standing waters. Adult mosquito control is accomplished by dispersion of malathion insecticide from Ultra-Low Volume (ULV) foggers.

Rodent control is accomplished by the use of glue pads, snap traps, and anticoagulant baits.

Household and nuisance pests are controlled through improved sanitation practices and crack and crevice treatment with residual spraying and fogging using 1 percent Baygon, 0.5 percent Diazinon, and 3 percent Pyrethrin.

Termite control consists of drilling and sub-slab treatment with 1 percent Chlordane. Current weed and vegetation control practices are included in Appendix K.

Additional pest or vegetation control is performed on an on-call, as-needed basis.

Past chemical usage includes the use of DDT until the middle 1960's. After DDT was restricted, Entomology personnel began using Dieldrin and Chlordane which later were restricted. The pesticide most commonly used today is Malathion, an organophosphate pesticide.

Currently, the Entomology facility is located in Building 410 with some chemical storage in Facility 326. In the past, Entomology operations were conducted in Building 357, which burned shortly after it had been abandoned.

Entomology personnel practice good chemical management and disposal operations. All used containers are triple-rinsed prior to offsite disposal to a county landfill.

c. Biological Agents

No evidence of the manufacture, storage, or use of military biological agents or any other biological agents was found at McClellan AFB.

d. Radiological Materials--Permits and Licenses

McClellan AFB is authorized by the Nuclear Regulatory Commission (NRC), coordinated through Brooks AFB, to handle small quantities of low level radioactive materials. These radioactive materials are primarily calibration sources used in calibrating radioactivity sensing equipment located in Building 677 and previously, until 1968, in Building 658.

A research lab in Building 628, under the control of the 1155th Technical Operations Squadron, also handles some radioactive materials for research purposes. All radioactive waste is properly containerized and temporarily stored at Storage Facility 1086 awaiting proper disposal.

No record or indication was found of any past disposal of radioactive materials conducted at McClellan AFB. However, interviews with long-term employees experienced in waste disposal operations indicated that some low level radium paint waste from Building 251 may have been disposed of in the old base burial pits. The waste was containerized in drums and sealed in concrete. Normal disposal procedure, coordinated by the base bioenvironmental engineering staff, was to store the containerized low level radioactive waste at an old salvage yard (also known as the radium yard) to await proper offsite disposal at a radioactive disposal site in accordance with Air Force technical orders.

No record or indication was found of past disposal of high level radioactive waste at McClellan AFB.

B. Disposal Operations

1. Liquid Wastewater Treatment

a. Sanitary Wastewater Treatment

Main Base Treatment

The Sanitary Wastewater Treatment Plant (SWTP), Facility 333, is located in the southeastern part of the base. Design hydraulic capacity is 2.0 mgd; however, the present average flow is approximately 1.5 mgd. The SWTP treats wastewater generated by office buildings, housing areas, and lavatories in the industrial areas onbase. Table 2

Table 2

SANITARY WASTEWATER TREATMENT

EFFLUENT WASTEWATER CHARACTERISTICS

Parameter	Effluent Concentration		NPDES Permit Conditions		Number of Values Exceeding Permit
	Average	Daily Maximum	Monthly Average	Daily Maximum	
Biochemical oxygen demand, mg/l	13.8	43	30	90	0
Suspended solids, mg/l	6.6	28	30	90	0
Settleable solids, ml/l	<0.1	<0.1	0.1	0.2	0
pH, standard pH units	6.8 min	8.0 max	6.5 min	8.5 max	0
Total coliform, No./100 ml	0[a]	0[a]	23	500	0

[a]Three values reported.

NOTE: Effluent compliance is 100 percent.

SOURCE: 1979 NPDES Annual Report.

presents typical SWTP effluent wastewater characteristics for the year 1979 [41]. The values are indicative of acceptable water quality and are within the limitations imposed by the current NPDES permit.

Waste sludge is stabilized through a two-stage anaerobic digestion process followed by dewatering on sludge drying beds. The dewatered sludge is used onbase as a soil supplement with the excess sludge disposed of in the base landfill. An analysis of the SWTP sludge (Table 3) indicates that the sludge is safe and does not possess any hazardous waste characteristics.

In addition to the SWTP, five septic tanks are in service at more remote areas of the base.

The Davis Communications Annex and Lincoln Communications Annex use septic tanks and evaporation/ percolation ponds for sanitary wastewater treatment. The Capehart Family Housing Annex sanitary wastewater is collected and pumped to a county-operated wastewater treatment facility. The laundry operations at Camp Kohler Annex ceased in 1973, and currently the only occupant is the 1155th Technical Operations Squadron, which operates a laboratory in Building 4000. Sanitary wastewater from Building 4000 is discharged to a county wastewater treatment plant located near the southeast property boundary. There is a small sanitary wastewater treatment plant at the McClellan Storage Annex which is no longer in use.

Further details on sanitary wastewater treatment are included in Appendix L.

Table 3
SANITARY WASTEWATER TREATMENT PLANT
SLUDGE ANALYSIS

Parameter	Concentration mg/Kg
Chloride	99
Boron	0.56
Cyanide	<0.01
Selenium	<0.005
Zinc	<0.05
Cadmium	<0.10
Chromium	<0.04
Copper	<0.01
Lead	<0.10
Silver	<0.02
Mercury	<0.01
Nickel	<0.10
Iron	<0.20
Volatile Organic Compounds	None Detected
Polychlorinated Biphenyls (PCBs)	None Detected
Organochlorine Pesticides	None Detected

SOURCE: Final Report for Investigating Ground Water Contaminants as of April 30, 1981, McClellan Air Force Base, California.

b. Industrial Wastewater Treatment

The industrial wastewater treatment plant (IWTP), Facility 714, is located in the west central part of the base. Design hydraulic capacity is 1.2 mgd; however, the present average flow is approximately 0.5 mgd. The wastewater received at the IWTP is relatively weak organically but is high in phenols and the heavy metal chromium. Table 4 presents typical IWTP effluent wastewater characteristics for the year 1979 [41]. The values are indicative of acceptable water quality; compliance with the limitations imposed by the current NPDES permit is greater than 99 percent.

Waste industrial sludge was, until recently, disposed of on-base in various sludge pits and burial pits. Currently, all waste industrial sludge is sent off-base to a State-approved chemical landfill.

Further details on industrial wastewater treatment are included in Appendix M.

c. Holding Ponds

McClellan AFB and associated facilities own and operate several holding ponds.

On the main base there are two blending or equalization ponds (600,000 gallons each) located at the IWTP for equalizing the industrial wastewater prior to treatment; two long, narrow ponds used as final polishing ponds for the industrial wastewater treatment plant effluent; and two holding ponds with a total capacity of 10 million gallons for temporary storage of reclaimed wastewater to be used around the base for cooling water, irrigation, various industrial uses, etc.

Table 4
INDUSTRIAL WASTEWATER TREATMENT
EFFLUENT WASTEWATER CHARACTERISTICS

Parameter	Effluent Concentration		NPDES Permit Conditions		Number of Values Exceeding Permit
	Average	Daily Maximum	Monthly Average	Daily Maximum	
Chemical oxygen demand, mg/l	66	253	None	None	0
Suspended solids, mg/l	10	68	30	60	1 daily max
Cadmium, mg/l	0.04	0.38	0.10	0.20	1 monthly avg 1 daily max
Chromium, mg/l					
Total	0.30	2.10	0.5	1.0	2 monthly avg 5 daily max
Hexavalent	<0.05	<0.05	0.05	0.10	0
Copper, mg/l	0.05	0.70	0.5	1.0	0
Total Cyanide, mg/l	0.02	0.16	0.5	1.0	0
Amenable Cyanide, mg/l	0.015	0.14	0.05	0.10	2 daily max
Lead, mg/l	0.05	0.39	0.05	0.10	2 monthly max 2 daily max
Nickel, mg/l	0.44	2.33	0.5	1.0	4 monthly max 4 daily max
Zinc, mg/l	0.19	0.96	0.5	1.0	0
Silver, mg/l	0.01	0.05	0.05	0.10	0
Phenol, mg/l	0.01	0.125	0.10	0.20	0
Oil and grease, mg/l	0.33	1.0	10	15	0
Settleable solids, ml/l	<0.1	<0.1	0.1	0.2	0
pH, standard pH units	6.0 min	8.2 max	6.5 min	8.5 max	1
Bioassay, % survival	95 min	98 med	70 min	90 med	0

NOTE: Effluent compliance is greater than 99 percent.

SOURCE: 1979 NPDES Annual Report data.

The Davis Communications Annex operates three evaporation/percolation ponds which receive discharge from the septic tank at the facility. The ponds were constructed due to the inability of the septic tank to accept the entire volume of domestic wastewater.

The Lincoln Communications Annex operates an evaporation/percolation pond (75 ft x 100 ft) which receives the discharge from a septic tank.

d. Stormwater Drainage

Runoff and storm drainage is collected from runways and streets through a series of culverts and ditches. Storm drainage from the southwest corner of the base is discharged offsite through a 60-inch reinforced concrete pipe to Arcade Creek, which discharges to the American River. Storm drainage from the remainder of the base is discharged to Magpie Creek, which in turn discharges to the Natomas East drainage canal, which discharges ultimately to the Sacramento River.

2. Solid Waste Disposal

a. Sanitary Landfill

McClellan AFB generates the following major nonhazardous solid waste streams (the estimated quantities are based on 1978 and 1980 data):

- Refuse from bases - 8,000 tons per year
- Refuse from base housing - 800 tons per year
- Demolition debris - 3,900 cubic yards per year

- Drainage debris - 260 cubic yards per year

- Dewatered sludge from the Sanitary Wastewater Treatment Plant (SWTP) - 50 cubic yards per year

- Excess military equipment--varies

At the present time, all wastes except limited amounts of demolition debris and sewage sludge (grit) are disposed of offsite. Refuse from the base and base housing has been handled by private contractors and the County since 1968. Sacramento County operates a transfer station on the southeast corner of McClellan AFB.

Significant hazardous waste streams that are currently generated at McClellan AFB are as follows (estimated quantities are not available for most categories):

- Dewatered sludge from the Industrial Wastewater Treatment Plant (IWTP) - 1,500 cubic yards per year or 3,650,000 gallons per year (undewatered)

- Plating bath solutions and sludges

- Contaminated degreasing solvents and sludges

- Paint residues

- Contaminated fuel and oils

- PCB liquids, solids, transformers, and other electrical components

- Miscellaneous laboratory chemicals

The above wastes are currently stored at various secure locations around the base with disposal handled by in-house contractors (to off-base secure landfills) or by DPDO for resale and recovery.

The waste streams described above are typical of the general types of wastes generated at McClellan since operations began. In the past, there have been changes in the wastes streams disposed of onsite; the types of materials (i.e., solvents) used have changed, and the quantities sold for recovery have varied. Past disposal practices have included landfills, burial pits, open burning, incineration, sludge drying beds, and landfarms. Interviews with past and present key employees and the review of records and files resulted in the identification of 36 waste disposal sites at McClellan AFB. These sites are shown on Figure 23. Photographs of some of the sites are included in Appendix A; and a priority rating of the sites, based on the potential for contaminant migration, is included in Appendix Q. A brief summary of the sites is given below:

- Site No. 1 was used as a refuse burning and burial pit from 1959 to 1962. It primarily served as a backup to facilities at site No. 22.

- Sites No. 2, 3, 4, 5, 7, and 26 were primarily used as undewatered industrial sludge disposal and oil burning pits from 1962. The latest site (No. 4) was in use until January 1981 and was classified as a Class II-1 site by the State. Site No. 2 was also used for burning and burial of refuse. The pits were generally 30 feet deep, 50 feet wide, and 300 to 400 feet long. All these sites except No. 4 have been closed. Site No. 26 was covered over during the construction of Building No. 1093. Fire training was also done in conjunction with some of these sites.

- Site No. 6 was used to burn waste oil, fuels, and solvents from 1972 to 1978.

- Site No. 8, classified by the California Regional Water Quality Control Board (CRWQCB) as a limited use Class II-1 disposal site, was used for disposal of dewatered industrial sludge, demolition debris, creek debris, paint chips and residues, and sanitary sewage sludge (grit) from 1974 to 1981. Currently, only sanitary sewage sludge (grit) and limited amounts of demolition wastes are disposed of at the landfill. The landfill is 400 feet long, 40 feet wide, and 30 feet deep.

o Sites No. 9, 10, 11, 12, 13, 14, 17, 18, and 19 were used as burial pits from prior to 1949 to 1959 and from 1967 to 1974. The sites received the ash and partially burned residue from the burning pit and teepee burner at site No. 22 and the incinerator at site No. 31. In addition, the sites probably received, at one point in time, all of the various solid and hazardous waste streams identified at the beginning of this section. These burial pits were approximately 30 feet deep, 50 feet wide, and 100 to 400 feet long. Fire training is currently done in the vicinity of sites No. 11, 12, and 13.

o Sites No. 15, 16, and 27 were used to bury sodium valves from aircraft engines during the 1940's and 1950's. The trenches were approximately 2 feet wide, 6 to 9 feet deep, and 15 to 20 feet long.

o Sites No. 20 and 21 were used for disposal of industrial sludge and oil during 1956 and 1957. The oil in these pits was probably burned periodically.

o Site No. 22 was the primary solid waste disposal facility from 1946 to 1963, and was used periodically until 1968. The pit (approximately 100 feet by 400 feet by 50 feet deep) was used for burning all refuse and oily wastes. The partially burned ash and residue was then removed for disposal at the burial pits. A sheet metal teepee burner was constructed at the east end of the pit during the mid-to late 1950's to improve the burning performance due to the water that would collect in the bottom of the pit. The original pit was then used for disposal of the ash during the late 1950's and early 1960's.

o Site No. 23 was used as a burial pit from 1966 to 1969. The wastes were removed and disposed of offsite in 1970 when Building 781 was constructed.

o Site No. 24 was used as a demolition and scrap material burning and burial pit from 1964 to 1969. The pit was burned monthly and waste oils and fuels were not disposed of at this pit.

o Site No. 25 was reported to be a burial pit used during the late 1940's and early 1950's. It may be confused with the confirmed location of site No. 37 or may be the site of the reported burial of a WW II Japanese fighter.

o Site No. 29 was used during 1974 for the burial of 50 to 60 aircraft generators. The pit was located along the north side of the CE storage yard. There is no reason to believe that the discarded generators contained PCBs.

o Site No. 31 was used as a full-scale refuse incinerator from 1963 to 1968. The facility was closed due to difficulty in meeting air emission requirements. The ash was buried in the onsite disposal pits active during this period.

o Site No. 33 was used for the temporary (2 to 4 months) landfarming of industrial waste treatment sludge during 1972.

o Site No. 35 was used to bury scrap strapping steel during the WW II era. The material was removed and disposed of offsite in 1950 during the construction of Building 652.

o Site No. 37 was used to bury refuse during the early 1950's. The material was removed during construction of Taxiway 7165 in 1957.

o Site No. 39 was the primary burning and disposal pit for all base wastes from prior to 1941 through 1946. The ashes were left in the pit instead of being removed as was done later at site No. 22.

o Site No. 41 was an area fill used for waste disposal during the mid-1940's according to aerial photographs. In all likelihood, the site was used for demolition debris and was the source of the wastes discovered during the construction of the IWTP equalization lagoons.

o Site No. 42 was used in varying configurations for oil storage and burning pits during the mid-1940's through the 1960's. In the 1940's, three parallel pits were used to store waste solvents used to fuel an old boiler. Later, the area appears to have contained a standby burning pit (for site No. 22) and a waste fuel burning pit used for fire training.

o Site No. 43 was used similarly to site No. 41 during the same period of time.

o Site No. 44 was used in the 1950's to bury 200 to 300 55-gallon drums of WW II runway camouflage paint. The paint had hardened and was reportedly latex-based rather than oil-based.

In addition to the information presented above, the interviews yielded the following general information about the disposal sites described above:

o Containers with cyanide wastes from the foundry furnace are probably buried in site disposal pits. Some containers were excavated and removed from pits 12 or 13 between 1967 and 1971.

o Low-level radioactive wastes may be buried in the landfills from the period prior to 1963. The wastes could include paper wrapped around radioactive instruments and old tubes from radar units.

o Most waste oils, and possibly waste solvents and fuels, were reportedly sold for reclamation off-base prior to the Korean war. From that point until the program for reclaiming and recovering waste petroleum products was initiated in the 1970's, most of these wastes were burned onsite. A system of 30 to 40 1,000-gallon bowsers was used to collect the wastes prior to disposal.

o Sludge from fuel tanks (including leaded products) is currently handled by outside contractors and the sludge disposed of off-base. Practices in the past may have included onsite disposal. Large quantities of leaded gas were used in the past.

o Empty herbicide and pesticide containers were crushed or punctured and sent to the on-base landfills. They have been sent to the transfer station with the regular base refuse since the late 1960's.

o The McClellan AFB clinic does not have a pathological waste incinerator. All wastes are and have been disposed of off-base.

o Plating shop wastes, prior to the construction of a new facility (including waste treatment) at Building 666 in 1958, went directly to disposal pits with little treatment. This included drummed cyanide wastes. Lead, tin, and antimony plating were done to the mid-1950's, and resulting wastes were also generated and disposed of in the landfills. These sludges should be relatively insoluble due to chromate stripping prior to disposal.

o Plating shop practices changed in the mid-1950's with construction of an industrial waste treatment plant and batch treatment facilities at Building 666. A pretreatment facility was added later. Disposal of the pretreatment and industrial waste sludges continued at the on-base burial pits. During the 1960's, incidents were recalled when cadmium plating wastes and electroplating chemicals were buried at the "back of the base."

o No recollections of battery disposal at the landfills were reported.

o No known off-base facilities presently use or have in the past used McClellan AFB sites for waste disposal.

o A ground and air tour of the waste disposal sites revealed no surface signs of leachate migration at the perimeter of the sites.

o There are no known waste disposal sites at McClellan AFB satellite facilities.

b. Contaminated Area

McClellan Air Force Base has, in addition to the contaminated waste disposal sites described in the preceding section, a number of other sites where waste practices in the past could result in the spread of contamination. Interviews with past and present key employees and review of records and files resulted in the identification of 10 such areas at McClellan AFB. These sites are shown on Figure 23. Photographs of some of the sites are included in Appendix A; and a priority rating of the sites, based on the potential for contaminant migration, is included in Appendix Q. A brief summary of the sites is given below:

- Site No. 28 was used as a creek debris sludge pit prior to 1972. Not only did it collect sediments but probably also served to contain spills and discharges of industrial wastes in the past.

- Site No. 29 was used by base Civil Engineering as a storage area for drums and transformers, some of which contain PCBs.

- Site No. 30 was used by the 1155th squadron (a *classified radiological chemical laboratory* operation conducting environmental analyses) for surface disposal of extremely small quantities of TCE, freon, diethyl ether, and low-level (not detectable on meter) radioactive wash water. These materials either evaporated on the paved storage yard or infiltrated the soil near the railroad tracks. Most of the industrial wastes from this facility go to the IWTP.

- Site No. 32 was used for the storage (prior to off-base disposal) of low-level radioactive and hazardous waste containers from prior to 1963 until 1975.

- Site No. 34 was used to store waste solvents in two underground tanks from 1950 to 1953. The purpose of the tanks was to accummulate the solvents for sale; however, most of the wastes were removed and burned on-base.

o Site No. 36 was used for the open storage of plating shop chemicals from 1958 to 1980. It is also possible that plating chemicals were dumped on the ground in this vicinity.

o Site No. 38 is the old engine repair shop where large quantities of carbon remover were used from the 1940's through the mid-1960's. Initially, an ethylene dichloride/cresylic acid/soap emulsion mixture was used, followed by a 50-50 mixture of cresylic acid and orthodichlorobenzene. The material was stored in both above and below-ground tanks, and at one point in time, it is possible that the used cleaner was stored in skimming ponds to facilitate separation and recovery of waste oil and cresylic acid. Contaminated carbon removal sludges were disposed of at onsite burial and sludge pits. Two hydrocarbon (solvent) recovery stills were also operated in this vicinity.

In the mid 1950's water supply well No. 7, near Building 475, was closed due to severe oil contamination (see Ground Water section for details).

o Site No. 40 was used to dewater industrial waste water treatment plant sludge (in four of the eight drying beds) from 1955 to 1972 and again in 1980. Prior to February 1980, these beds were not lined with concrete and relied on reportedly relatively impermeable underlying soils and an underdrain system to capture drainage liquids. The current industrial sludges contain significant concentrations of volatile organic carbons, and it is likely that similar levels occurred in the past.

o Site No. 45 is a recently purchased piece of property with PCB surface contamination caused by the past owner. An unconfirmed report from one of the interviewees indicated the possible presence of an old burial pit on the site.

Other sites of interest include the following:

o RCRA hazardous waste T/S/D facilities: oil skimmer near the SWTP, asbestos storage in Building 644, two 500-gallon waste solvent tanks near Building 640, 15,000-gallon contaminated fuel tank near Building 756, and hazardous waste storage at Building 636.

o PCB storage facilities are located in Buildings 624C and 624D and 636. There was reportedly a minor PCB spill near the latter building in 1972 or 1973 when it was operated by exterior electric.

o Paint stripping operations at Buildings 658 and 375 generated large amounts of caustic and phenolic wastes.

o An acetone recovery still was operated for less than 1 year near Building 351. The still was later used for less than 3 months in an unsuccessful attempt to recover TCE.

o Herbicide and pesticide drums were tripled rinsed on the ground (rather than rinsed to the sewer) probably in the vicinity of the old Entomology Building 375). This old structure was burned after most of the chemicals were removed. The remaining material after the fire probably went to an on-base disposal pit.

o There were no reported fuel leakage or spill problems in the past that would result in any significant contamination problems.

o There have been several recent fires involving stored hazardous materials or wastes at DPDO and 1155th facilities. These areas were cleaned up under the direction of the Bioenvironmental Engineering and Civil Engineering Environmental Planning staffs and the Base Chemist.

3. Demolition and Burning Ground Areas

a. Demolition Areas

There are no munitions disposal operations conducted at McClellan AFB. All unexploded ordnance (UXO) disposal work is done at Hill AFB, Ogden, Utah, which also provides an explosive ordnance disposal team to take charge of any unexploded ordnance at McClellan AFB. No record or indication was found from the installation records or from the interviews that any UXO has been found at McClellan AFB. A small arms proficiency firing range and a skeet shooting range are located at the northwest corner of the base. There is also a munitions storage area for smoke bombs, flares, tracer cartridges for fighter aircraft, ejection seat cartridges, and small arms ammunition. Outdated munitions are sent to Hill AFB, Ogden, Utah, for disposal. There has never been a bombing range at McClellan AFB.

b. Burning Grounds

Other than the fire training area, there are currently no active burning ground areas at McClellan AFB. The fire training area, located near the base landfill, uses contaminated JP-4 for fire training proficiency exercises. This facility has been in operation since 1977. Past fire training areas included a site near Building 431 used until the late 1960's; a site near Building 1093 used until the mid 1970's; and a site near Taxiway 12 used until 1973.

According to the interviews, past burning ground activities at McClellan AFB included the following:

(1) Site No. 22 (Figure 23) was a major burn pit used from 1946 until about 1966 for burning of general refuse, including some waste solvents and chemicals.

(2) Site No. 24 (Figure 23) was a burn pit area used from 1964 until 1969, primarily for disposal of scrap lumber and paper.

(3) Site No. 39 (Figure 23) was a major burn pit area located near the sanitary wastewater treatment plant. This site is believed to be the original general refuse disposal area for McClellan AFB and was used from prior to 1941 to 1946.

(4) Site No. 6 (Figure 23) was a small burn pit used from 1972 until 1978 to burn skimmed oil from the main sludge disposal pits.

(5) Waste solvents and oils were periodically burned in Sludge/Oil Pits 2 and 5 (Figure 23).

(6) Site No. 29 (Figure 23) was a burn pit area operated prior to 1970.

(7) There was an old burn pit in operation at the Davis Communications Annex until about 1965. The site was used for general refuse disposal and was located near the former west property boundary.

The above burning grounds have been discussed previously in Section II.B.2.a., "Sanitary Landfills."

During the course of the interviews, several past major fires at McClellan AFB were brought to our attention:

(1) Major fires occurred at the Defense Property Disposal Office Storage Lots 9 and 10 from 1967 through 1968. Clean-up debris from the fires was sent to the base landfill for disposal.

(2) A major fire occurred at the 1155th Technical Operations Squadron Laboratory Storage Building 629 in 1979. Clean-up debris from the fire was sent to the base landfill for disposal.

(3) A fuel spill occurred at a storage tank near Building 665. About 4,000 gallons of spilled JP-4 were burned off.

4. Demilitarization

No record or indication was found of any type of demilitarization operations, either past or present, conducted at McClellan AFB.

C. Water Quality

1. Surface

No appreciable amount of surface water flows through McClellan AFB. However, several small creeks or drainage ditches flow through or drain the basin area. Creeks of interest are Magpie Creek, Arcade Creek, Second Creek, and Dry Creek with Magpie Creek comprising the major surface water in the base area.

Magpie Creek is a small creek which originates just east of the base and flows west to the Natomas East Main Drainage Canal and eventually to the Sacramento River. The majority of the flow consists of the effluents from the domestic and industrial wastewater treatment plants onbase, and from the County San Six Wastewater Treatment Plant.

Arcade Creek and Second Creek receive drainage from McClellan AFB and are listed as NPDES discharges from McClellan.

Dry Creek is a small creek flowing through the north section of McClellan AFB. The only contributions to the creek from the base would be runoff generated in the north section of the base, which is relatively non-industrialized.

Water quality in the creeks is generally good and is in compliance with NPDES discharge criteria. Due to the dry climate of the region, several of the creeks, Arcade Creek and Second Creek, have periods of little or no flow. During extremely dry periods, the flow in Magpie Creek is almost totally comprised of the effluents from the wastewater treatment plants.

2. <u>Subsurface</u>

a. <u>General</u>

As previously discussed in Section I.E.3.e. "Ground Water", subsurface water quality under natural conditions is excellent for most purposes. Table 5 lists the average chemical characteristics of water supply wells in 1976-77 and compares those results with the average values reported in 1957 [26, 40]. For those characteristics listed, most have remained essentially unchanged over this

Table 5
EXISTING WATER SUPPLY QUALITY [26, 40]
(Average of 7 Wells)

Chemical Characteristics	1976 - 1977 Concentration (mg/l)	1957 Concentration (mg/l)
Arsenic	<0.01	--
Barium	<1.00	--
Cadmium	<0.01	--
Copper	<0.10	--
Cyanide	<0.01	--
Fluoride	0.20	0.008
Iron	0.10	0.02
Lead	<0.01	--
Selenium	<0.01	--
Silver	<0.02	--
Surfactants	<0.20	--
Zinc	<0.10	--
Boron	<0.10	--
Nickel	<0.10	--
Silica	85	76.9
Calcium	17	18.1
Magnesium	13	13.4
Sodium	16	19.9[a]
Potassium	2.	
Bicarbonate	125	122.8
Carbonate	0	0
Sulfate	5	6.93
Chloride	18	22.4
Nitrite and Nitrate Nitrogen	0.03	1.41
Specific conductance	270	--
Dissolved solids	220	219.5
Hardness (total) as ($CaCO_3$)	95	96.5
Noncarbonate	0	0.9
Alkalinity	100	90.8

[a]Sodium and potassium.

Note: Modified from SCS Engineers, 1978; and Cyril Williams, 1957

20 year period. The only exception is iron, reportedly much higher in 1976-77 than in 1957. This could be attributed to the fact that the older system has higher concentrations of iron dissolved from the casing and pump column than the newer system.

b. Trichloroethylene Ground-Water Contamination

A major concern at McClellan AFB is the recently discovered trichloroethylene (TCE) ground-water contamination problem. Since this is a primary concern with McClellan AFB and the surrounding community, the major portion of this section of the report deals with the TCE problem and the results of a comprehensive investigation conducted by McClellan and presented in "Final Report for Investigating Groundwater Contamination as of 30 April 1981, McClellan Air Force Base, California" [16].

i. Introduction

TCE ground-water contamination was first discovered in early 1979 in the Rancho Cordova area of Sacramento County. The contamination in this area is apparently the result of past land disposal of waste solvents and sludges containing volatile organic carbon (VOC) compounds at an industrial complex in the area (not connected with McClellan AFB). As a result of the newly discovered TCE ground-water contamination problem at Rancho Cordova, McClellan AFB voluntarily created a committee in August, 1979 to determine if TCE ground-water contamination was also a problem at McClellan AFB and the surrounding community. Four base wells were sampled for volatile organic carbon (VOC) compounds including TCE. The initial results showed low TCE concentrations in Well No. 18, located at the southwest portion of the base and trace TCE concentrations in Well No. 28, located at the northwest portion of the base in the vicinity of the old sludge/oil disposal pits.

On November 9, 1979, McClellan initiated a meeting with the California Regional Water Quality Control Board and representatives of the City, County, and the California Department of Health Services to discuss the initial TCE data. This meeting resulted in the implementation of a cooperative onbase and offbase monitoring program to determine the extent of TCE ground-water contamination. Further monitoring indicated TCE ground-water contamination as follows:

(1) Contamination of McClellan AFB Wells 1 and 2 located in the southeast portion of the base.

(2) Contamination of a private well located northwest of the base (Higgs residence).

(3) Contamination of a private well (Russel residence) and City Well No. 150 located southwest of the base.

The private residence in the northwest area installed a new well to replace the contaminated well. Recent analyses show that this new well is clean and not contaminated with TCE. The City closed Well No. 150 and the private household in the southwest area connected to the city water system. McClellan AFB closed its contaminated Wells 1 and 2. Subsequently, base well No. 12, located near Wells 1 and 2, was closed in August, 1980 due to TCE contamination. Well No. 18 was left online since its water could be blended in the base distribution system to yield safe TCE levels. Chloroform was also found in some of the wells; however, the chloroform levels were below the EPA standard of 100 parts per billion (ppb) which is within acceptable health limitations.

The recommended safe drinking water levels for TCE varies among regulatory agencies; however, McClellan agreed to comply with 4.5 parts per billion of TCE, the most stringent level adopted by the California Department of Health Services, as the safe drinking water level for onbase potable water. According to cancer risk studies, an individual drinking two liters of water per day containing 4.5 ppb of TCE over a 70 year lifetime would have a statistical probability of one additional chance in a million of getting cancer.

ii. Actions Taken by McClellan Since the Initial Discovery of TCE

Actions taken by McClellan AFB since the discovery of the TCE contamination problem in November, 1979 include the following:

(1) An investigation was conducted into past waste disposal practices at McClellan AFB in an attempt to identify the sources of the TCE contamination. Figure 24 shows the approximate areas of past TCE usage on the base.

(2) An initial identification was made of the TCE contaminated areas based on the initial monitoring well results. Figure 25 shows the suspect source areas for TCE contamination.

(3) A drinking water protection program was developed and implemented at McClellan including routine weekly monitoring of seven strategic points in the base water distribution system including the wells supplying water to the distribution system. Figure 27 shows the locations of the onbase distribution sampling points. In addition, off-line wells are routinely monitored every other week. This program was reviewed and approved by the California Department of Health Services.

(4) An initial field survey program was implemented, including monitoring wells and exploratory soil borings, in an attempt to determine the source(s) and extent of onbase TCE contamination. Figure 13 shows the locations of the base wells and monitoring wells and indicates those wells contaminated with TCE. The above field survey program is still underway and will be expanded in the near future.

iii. Historical TCE Usage Onbase

A history of the TCE usage at McClellan AFB was developed from interviews of long-time employees. This historical TCE usage is summarized below:

(1) During the 1940's, TCE and other solvents were disposed of in the burning pit located in the vicinity of Building 714 (Site No. 22 on Figure 23).

(2) During the 1950's and early 1960's, attempts were made to reclaim TCE using solvent recovery stills. This process proved to be ineffective and consequently, significant amounts of TCE were disposed of at the base burn pit (Site No. 22).

(3) During the time period 1962 through 1963, McClellan attempted to reclaim all comingled oils and solvents through the Defense Property Disposal Office (DPDO). Reclamation of TCE proved to be ineffective and consequently, TCE contaminated wastes were disposed in the base sludge pits (Sites 2, 4, 5, 7, and 8 on Figure 23).

(4) From 1963 through the early 1970's, base usage of TCE was curtailed due to air pollution concerns. Other cleaning solvents such as tetrachloroethylene, freon, and 1,1,1-trichloroethane were substituted for TCE.

(5) In 1976, solvent dumping at the sludge pits was curtailed and the primary method of disposal was containerized and reclamation or disposal at off-base State approved chemical landfills.

(6) In 1978, the use of TCE was completely banned at McClellan AFB for air pollution reasons.

(7) As of January 1981, industrial waste sludge is no longer disposed of in the sludge pit or the base landfill, but is hauled offsite by a contractor to a State approved chemical landfill.

Based on the above historical summary, suspect sources for the existing TCE contamination problem are the past sludge/oil pits, and burn pits where solvents, including TCE, were disposed of in the past.

iv. Base Contaminated Areas

Four areas of TCE contamination were found onbase (Figure 25). These areas, designated as Areas A, B, C, and D, are discussed below.

o Area A is located in the southeast portion of the base and is the area where base Wells 1, 2 and 12 were closed due to TCE contamination. Soil explorative samples taken in late 1980 (five locations at different depths, seventy-six soil samples) showed little to no VOC contamination from a depth of 120 to 140 feet. The soil sampling technique used is in question and no conclusions can be made from the apparent absence of VOC in the soil. To date, no definite source of the TCE contamination in Area A has been found.

o Area B is located in the southwest portion of the base and is the area where low level TCE contamination is present in Base Well 18 and is nearby the offbase area where a private well and City Well No. 150 were closed due to TCE contamination. Soil explorative samples taken in late 1980 (four locations at different depths, sixty-four soil samples) showed no VOC contamination of the soil. To date, no definite source of the TCE contamination in Area B has been found.

o Area C is located in the western portion of the base and includes the present base landfill site and numerous past disposal sites. Solid waste, industrial waste sludge, and waste solvents, oils and chemicals were disposed of at these sites in the past. Monitoring Well No. 2 is located in Area C, and shows contamination (Table 6) although at much lower levels than in monitoring Well No. 1. Although no definite contamination source has been identified, the nature of the contaminants in the monitoring well and the probable southwesterly direction of groundwater movement indicate that the contamination source could be the sludge pits in Area D or Sludge Pit No. 7.

o Area D is located in the northwest portion of the base and includes the past sludge/oil disposal pit sites. Area D is also nearby the offbase area where a private well was closed due to TCE contamination. Monitoring Well No. 1 is located in Area D and shows high level VOC contamination (Table 7). The nature of the contaminants in Monitoring Well No. 1 are similar to those present in the nearby sludge pit (Table 8) making the sludge pits likely sources of the contamination.

Table 6
VOLATILE ORGANICS AND PRIORITY POLLUTANT RESULTS
FOR MONITORING WELL NO. 2

A. Volatile Organics (ppb)[a]

Contaminant/Approx. Depth Sample Taken	81' Water Surface	113'	145'	170'	208'
1,1 - Dichloroethylene	7.8				
1,1 - Dichloroethane		1.4	0.90	1.2	
Chloroform[b] 1,1,2 Trichloro-2,2,1-Trifluoroethane[b]		1.8			
1,2 - Dichloroethane	12	1.8		0.67	
1,1,1 - Trichloroethane	2.4	0.70	0.58	0.48	
Trichloroethylene (TCE)	19	9.2	4.6	5.3	1.4
1,1,2 - Trichloroethane[b] Dibromochloromethane[b]		1.1	0.68	0.73	
Trans-1,2-Dichloroethylene			0.61		

B. Priority Pollutants (ppb)

Contaminant/Depth Sample Taken	Water Surface 81'	113'	208'
Bis (2-Ethylhexyl) Phthalate	15	<10	13

[a] Compounds were detected by the purge/trap technique with Coulson gas-chromatography.
[b] Pairs cannot be distinguished by the above technique.

Source: Final Report for Investigating Ground Water Contamination as of 30 April 1981, McClellan Air Force Base, California.

Table 7
VOLATILE ORGANICS AND PRIORITY POLLUTANT RESULTS
FOR MONITORING WELL NO. 1

A. Volatile Organics (ppb)[a]

Contaminant/Approx. Depth Sample Taken	79' Water Surface	115'	148'	205'	220'
1,1 - Dichloroethylene	5,600	852	5.3	2.3	54
1,1 - Dichloroethane	350	36	0.33	0.18	4.4
1,2 - Dichloroethane	500	110	0.41	0.17	4.5
1,1,1 - Trichloroethane	12,000	1,066	1.55	0.62	6.8
Trichloroethylene (TCE)	9,100	1,008	7.0	3.4	73.6
1,2 -Dibromoethane					5.9
Dibromochloromethane					51

B. Priority Pollutants (ppb)

Contaminant/Depth Sample Taken	Water Surface 79'	148'	205'	220'
1,2 - Dichlorobenzene	126	ND[b]	ND	ND
1,3 - Dichlorobenzene	12	ND	ND	ND
Bis (2-Ethylhexyl) Phthalate	10	<10	<10	<10

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[a] Compounds were detected by the purge/trap technique with Coulson gas-chromatography.
[b] ND = none detected.

Source: Final Report for Investigating Ground Water Contamination as of 30 April 1981, McClellan Air Force Base, California.

Table 8
RESULTS OF SLUDGE PIT AND INDUSTRIAL WASTE SLUDGE ANALYSES

A. Sludge Pit

High Contaminants	Value (ppb)
1,1,1 Trichloroethane (methyl chloroform)	34,400
Trichloroethylene (TCE)	29,600
1,1 Dichloroethane	49,600
Ethylbenzene	27,200
Toluene	335,000
Naphthalene	46,800
Tetrachloroethylene	23,200
1,2 Dichlorobenzene	76,140
Bis (2-Ethylhexyl) Phthalate	14,000
1,2-Trans-Dichloroethylene	54,400
Methylene Chloride	27,200
Benzene	50,000

NOTES:
1. No Polychlorinated Biphenyls (PCBs) were detected.
2. No organic chlorine pesticides were detected.
3. Organic acid compounds, including phenols, were present in significant quantities but could not be identified due to sample complexity.

B. Industrial Waste Sludge

High Contaminants	Value (ppb)
Chloroform and 1,1,2-Trichloro-2,2,1-Trifluoroethane	3,600
Tetrachloroethylene	3,400
Trichloroethylene (TCE)	840
1,1,1-Trichloroethane	520

SOURCE: Final Report for Investigating Ground-Water Contamination as of 30 April 1981, McClellan Air Force Base, California.

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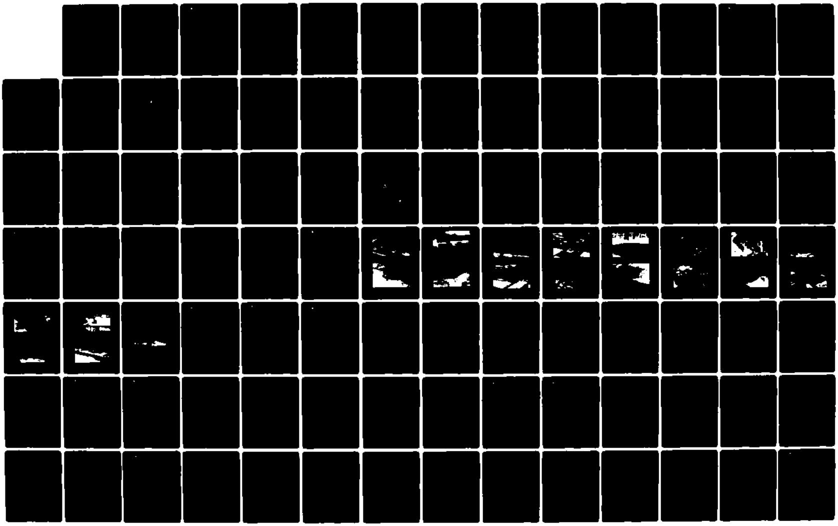

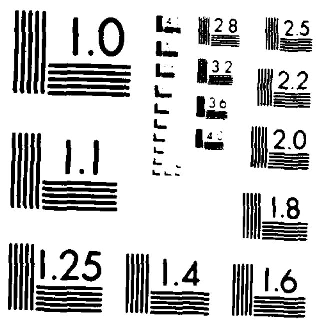

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

c. Camp Kohler

The two water supply wells at Camp Kohler have good water quality. Recent tests showed that no volatile organic carbon compounds or TCE are present in the wells. The wells have been routinely tested over the years and no deterioration of water quality parameters, e.g., chloride, calcium, or total dissolved solids, has been observed.

The Arcade Water District, however, removed its Production Well No. 31 from service in 1979 due to increased levels of chloride, calcium, and total dissolved solids in the well. Their report is included in Appendix N. This well is located about 2,000 feet west of Camp Kohler. Waste brine regenerant solution from past ion exchange water softening operations at Camp Kohler is a suspect source of the well contamination. However, no indication was found from the interviews that spent brine regenerant was improperly disposed of at Camp Kohler in the past.

3. NPDES Permits

Presently, McClellan AFB discharges are controlled by State NPDES Permit No. CA0004359, which became effective November 27, 1978. Details of the current permit are given in Appendix O. After July 1, 1981, the discharge to surface waters from McClellan domestic and industrial wastewater treatment plants is prohibited. Both streams will be reused onbase for cooling water make-up, irrigation, and other non-potable base uses.

Wastewater discharges from the Davis site are controlled by State Resolution Order No. 81-015 (permit details included in Appendix O).

Further details on NPDES permits are included in Appendix O.

III. INSTALLATION ASSESSMENT

III. INSTALLATION ASSESSMENT

A. Conclusions

The McClellan AFB Records Search resulted in the identification of two main areas of concern, i.e., polychlorinated biphenyls (PCBs), and trichloroethylene (TCE) ground-water contamination. The major conclusions addressing the above areas of concern are given below. Further details are provided in the following Section III.B. "Recommendations."

1. Polychorinated Biphenyls (PCBs)

a. McClellan's existing procedures for handling, storage, and disposal of PCBs and PCB-contaminated items appears adequate to prevent PCB contaminant migration off the base in surface waters or ground water.

b. McClellan has been responsive in PCB sampling and PCB contamination clean-up efforts involving two past offsite contractor PCB spill incidents (i.e., Billington Motor and Armature Works in Rancho Cordova, and Tayko Industries in Sacramento). The incidents involved the spilling of PCBs at Billington and the suspected spilling of PCBs at Tayko while the contractors were repairing equipment belonging to McClellan.

c. The installation records, the interviews, and existing water quality data gave no indication that PCBs are migrating off the base in surface waters or in the ground water.

d. A PCB contamination problem exists in a small area recently purchased by McClellan, located at the northwest corner of the runway clear zone. The PCB contamination is a result of salvage yard operations at this site by the former owner of the property. Additional work needs to be done to clean up the PCB contamination and to ensure that PCBs are not migrating off this site.

2. Trichloroethylene (TCE) Ground-Water Contamination

a. McClellan's existing procedures for handling, storage, and disposal of waste oils and solvents appears adequate to prevent contaminant migration off the base in surface waters or ground water. However, past disposal practices may have resulted in ground-water contamination by volatile organic compounds, primarily trichloroethylene (TCE). A major expanded ground-water monitoring effort (Phase II of the Installation Restoration Program) needs to be implemented to pinpoint the source(s) and the extent of the TCE ground-water contamination.

b. Recent analyses of onbase and offbase wells indicate that the TCE ground-water contamination at McClellan AFB and in the surrounding community has not intensified since the contamination was first discovered in November 1979.

c. Ground-water monitoring and exploratory soil sampling performed by McClellan indicate that the old sludge/oil disposal sites are possible sources of TCE contamination in Area "D", which is located in the northwest portion of the base.

d. No definite source has yet been identified for the TCE ground-water contamination in Area "C", which is near the base landfill, and Area "B", which is located in the southwest portion of the base. Possible sources of the TCE contamination include the old landfill and burial pit sites in Area "C" and the old sludge/oil pit disposal sites in Area "D".

e. No definite source has yet been identified for the TCE ground-water contamination in Area "A", which is located in the southeast portion of the base in the area where three base wells have been closed due to TCE contamination. Possible sources of the contamination, in order of decreasing importance, are as follows:

i. General spillage of solvents on the ground, including TCE, may have occurred in this area in the past. Area "A" has always been involved in major industrial activities since the inception of the base in 1936. A small TCE recovery still was also in operation (behind Building 351) for a short period of time in the late 1950's. The TCE contamination may be contained in the upper soil layers above the subsurface hardpan. A possible avenue of contamination may be the migration of the contaminants from the upper soil strata, through the gravel packing of the base wells, and down into the ground-water aquifer.

ii. The ground water in the vicinity of Building 475, the location of the old reciprocating engine repair shop, is known to be contaminated with cresylic acid and possibly dichlorobenzene. Large quantities of these solvents were used at the site, including a large-scale solvent recovery operation. Base Well No. 7 was closed in the 1950's because of massive cresylic acid solvent contamination. Since TCE was also used in this area, the possibility exists that it may also be a contaminant in the ground water.

iii. The sludge drying beds located at the sanitary wastewater treatment plant were used from 1955 until 1972 to dewater industrial waste sludge. The drying beds, at that time, did not have concrete bottoms and the possibility exists that TCE contaminated filtrate from the drying beds may have percolated into the upper soil strata at this location.

iv. All of the above areas are located close enough to the wells contaminated in Area "A" to be suspect sources of the contamination.

3. Other

a. The Arcade Water District production well No. 31, located about 2,000 feet west of Camp Kohler, has recently been closed due to degradation of well water quality (high chloride, calcium, and total dissolved solids concentration). Camp Kohler is a possible suspect source of the contamination because of past ion exchange water softening operations associated with the base laundry. Although no evidence was found during the Records Search of improper disposal of spent regenerant salt brine solutions from the water softening operation, additional investigations based on existing records need to be conducted before Camp Kohler can be eliminated as a suspect contamination source.

b. No indication was found from the records or from the interviews of hazardous waste disposal or contaminant migration at the other installations included in the Records Search, i.e., Lincoln Communications Annex, Davis Communications Annex, McClellan Storage Annex, Sacramento River Dock Annex, and Capehart Family Housing Annex.

B. Recommendations

Recommendations are presented below for the two main areas of concern as determined from the Records Search, i.e., PCBs and TCE ground-water contamination.

1. Polychlorinated Biphenyls (PCBs)

McClellan has already initiated remedial actions at the newly discovered PCB contamination site, including soil sampling, security of the area, and plans for clean-up of the contaminated soil. However, one of the interviews indicated (unconfirmed) that the former owner and operator of the salvage yard at this location used one or more burial pits at the site for disposal of waste materials. If this is the case, then the possibility exists that the PCB contamination may be more extensive than just the topsoil surface. The existence of past burial pit(s) at the site needs to be confirmed and verified, e.g., by seismic survey of the area. If the existence of one or more burial pits is confirmed, then it is recommended that exploratory soil sampling down to the subsurface hardpan be conducted to determine the presence, if any, and the extent of subsurface PCB contamination at this site. Ground-water monitoring should also be done to determine if PCBs have entered the subsurface aquifer. This may have occurred if the burial pit(s) were deep enough to break through the subsurface hardpan layer. Extreme caution should be exercised in conducting the soil sampling and ground-water monitoring to prevent the accidental introduction of PCBs into the ground water. Soil sampling should be done down to the hardpan layer, and the hardpan layer itself should be left intact. The ground-water monitoring well should be properly constructed, cased, and packed to prevent the possibility of PCBs from the upper soil strata from entering the subsurface aquifer through improperly constructed monitoring wells.

2. <u>Trichloroethylene (TCE) Ground-Water Contamination</u>

a. McClellan AFB should immediately implement an expanded monitoring program to determine the source(s) and the extent of TCE ground-water contamination onbase and in the surrounding community. The scope of the expanded monitoring program should include the following:

i. Locate and determine the condition of Production Well No. 7, reported to have been plugged. Determine if the well has been properly plugged and is not acting as a conduit for contamination.

ii. Conduct a geophysical logging and depth sampling investigation of selected wells including Wells No. 1, 2, 12, 18, and 28. The investigation should consist of gamma ray log, caliper log, pumped and static flowmeter log, pumped and static fluid conductance log, pumped and static temperature log, and pumped and static depth samples collected at intervals determined from the geophyical logs.

iii. Design and implement an expanded monitoring well program based on the analysis of data obtained from the geophysical logging and sampling effort. Specific areas which should be addressed in the expanded monitoring program include:

- <u>Area A</u>--The sludge drying beds at the SWTP and the old reciprocating engine repair area (Building 475) in the vicinity of abandoned base well No. 7.

- <u>Area B</u>--The 1155th laboratory area.

- <u>Area C</u>--Burning pit and burial pit sites No. 7 through 16, and 17 through 22.

- <u>Area D</u>--Sludge/oil pit sites No. 1 through 6.

- <u>Other</u>--Upgradient and downgradient wells as deemed necessary to define the path of contaminant migration.

b. Any new monitoring wells should be carefully constructed to prevent the possibility of accidental introduction of TCE, or other volatile organic contaminants, into the subsurface aquifer by migration from the upper soil strata through improperly constructed wells and casings.

c. Although recent analyses indicate that the extent of the TCE ground-water contamination has not increased since 1979, routine monitoring of nearby offbase City and private wells should be done as an early warning precaution in case the contaminant migration continues to spread in the future. The offbase monitoring should be a joint cooperative effort involving McClellan AFB, the City, the California Regional Water Quality Control Board, and the Department of Health Services.

d. Other ground-water monitoring analyses should be conducted in addition to TCE and volatile organic compounds, including acid and base extractable priority pollutants. Many priority pollutants were found to be major contaminants in the sludge pit samples, and may therefore also be contaminating the ground water. The additional analyses could be done on a one-time basis, unless the analyses indicate the presence of additional major contaminants, other than TCE, in the ground water.

e. The final details of the expanded monitoring program including sampling locations, sampling methodology, analyses required, sampling frequency, and monitoring well construction methods, should be developed with input from the California Regional Water Quality Control Board and the U.S. Geological Survey.

f. The restoration and/or containment of the hazardous waste source(s) should commence as soon as sufficient information is obtained from the expanded Phase II studies to pinpoint their location(s) and the extent of the contaminant migration.

3. Other

Further investigations should be conducted in cooperation with the Arcade Water District to determine the source of water quality degradation in Arcade Well No. 31. The investigations should include a detailed review of available water quality data, well logs, and well construction details for the two Camp Kohler supply wells and Arcade Wells No. 31, 16, 44, and 56.

The above recommendations are intended to serve as guidelines for the formulation of follow-on actions.

FIGURES

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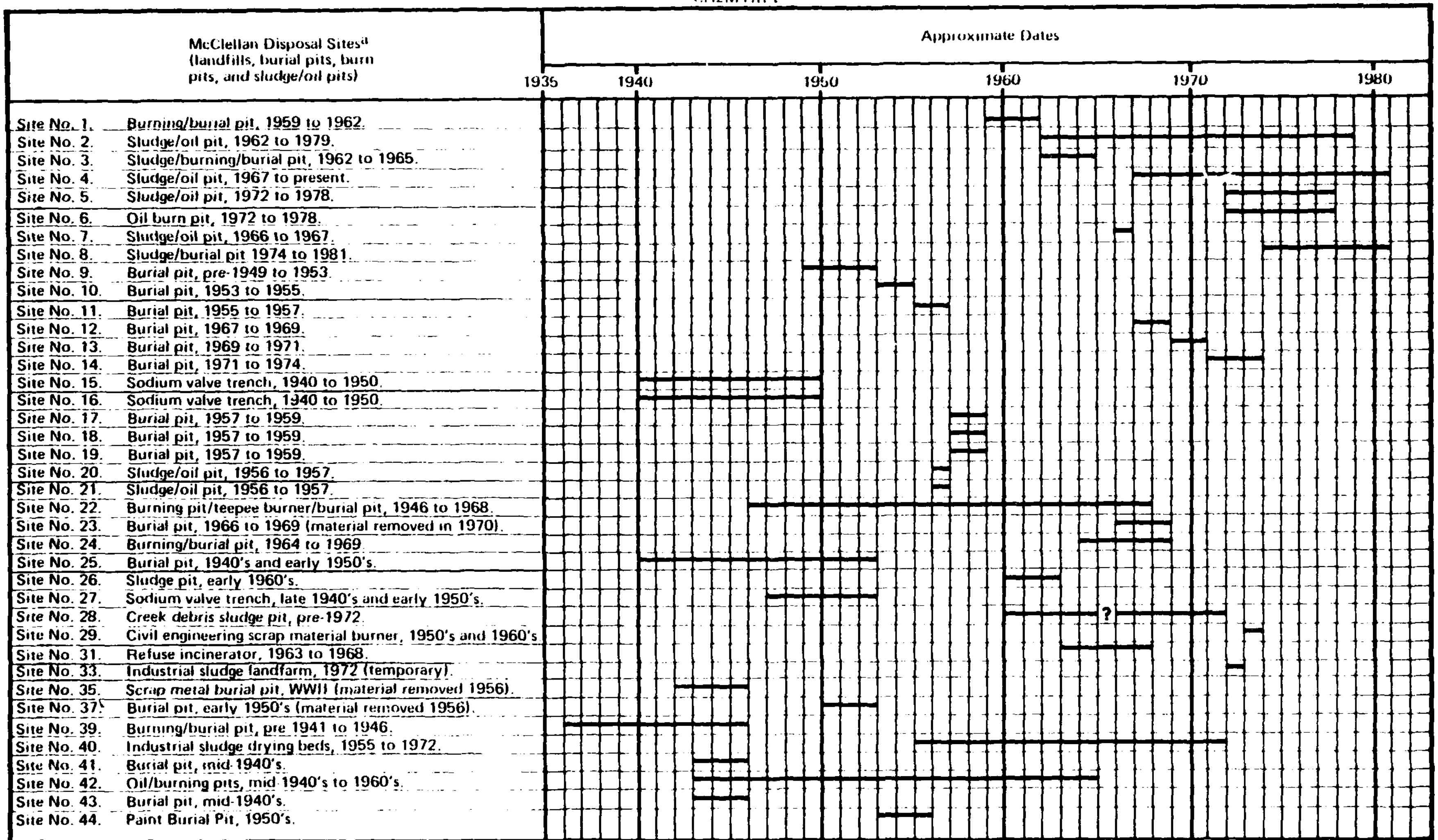

[a]Refer to Figure 23 in text for site locations.

FIGURE 1. Historical summary of onsite disposal activities at McClellan AFB.

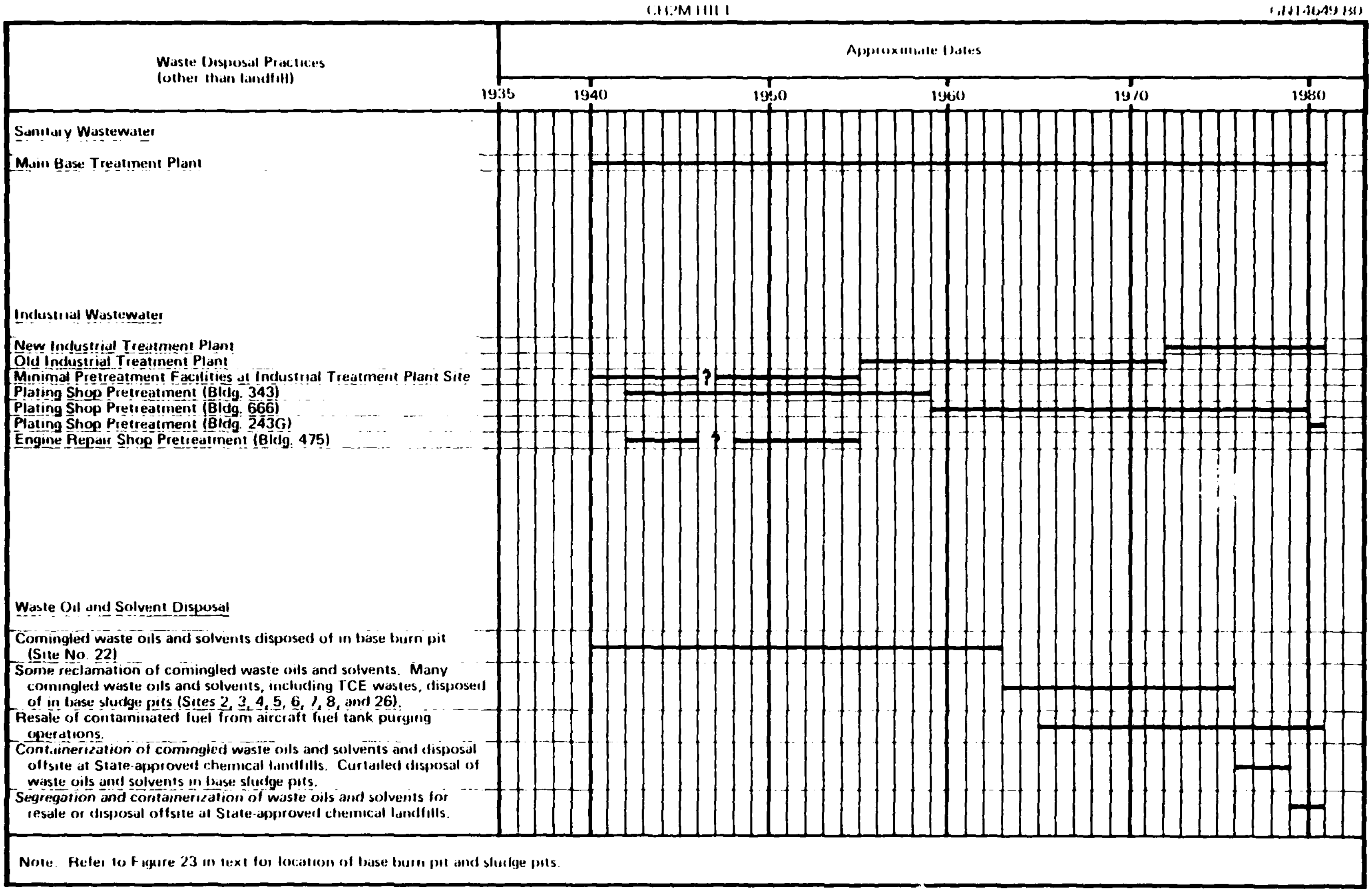

FIGURE 2. Historical summary of waste disposal practices other than landfills at McClellan AFB.

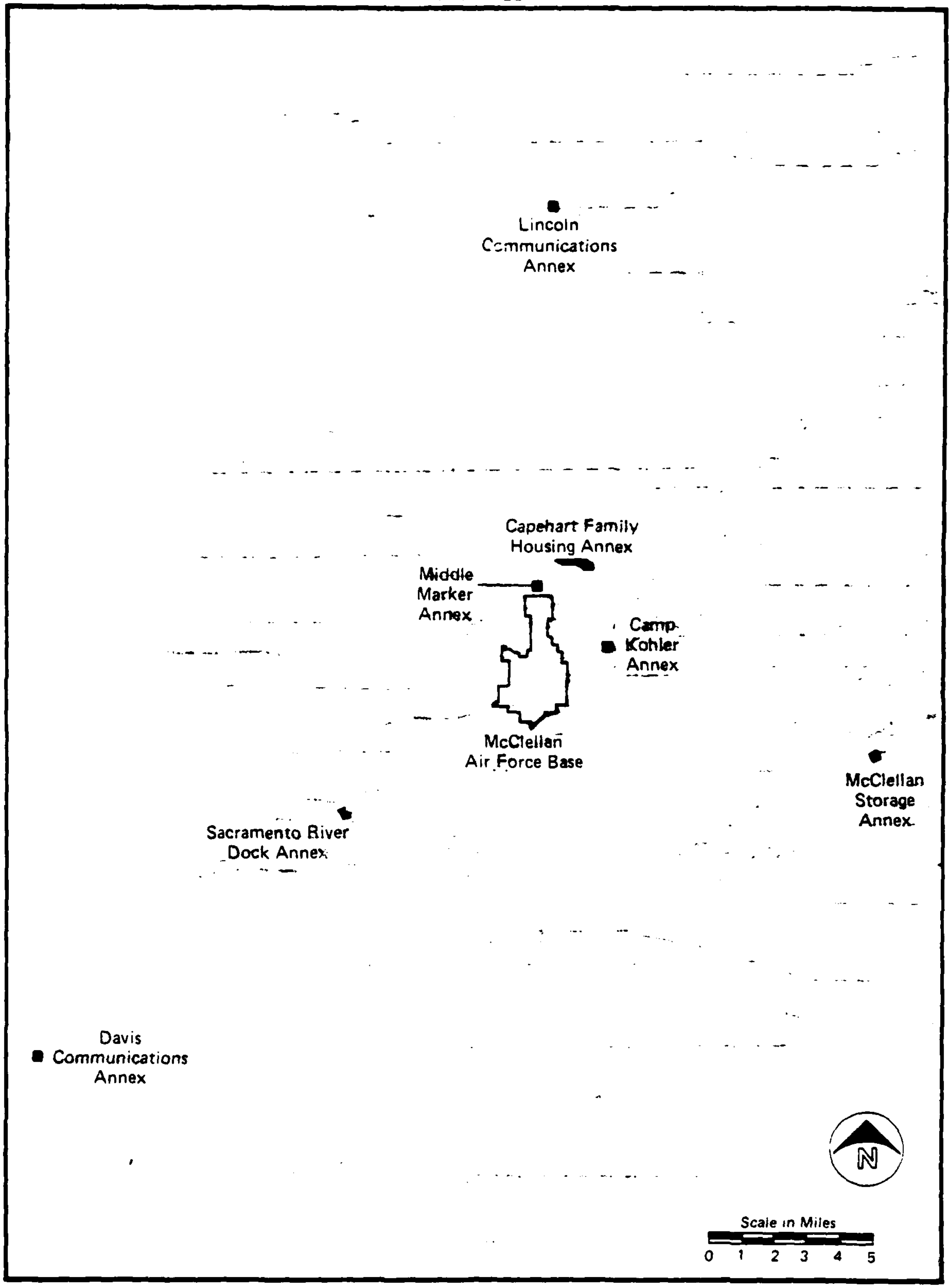

FIGURE 3. Location of McClellan Air Force Base and McClellan supported installations included in the records search.

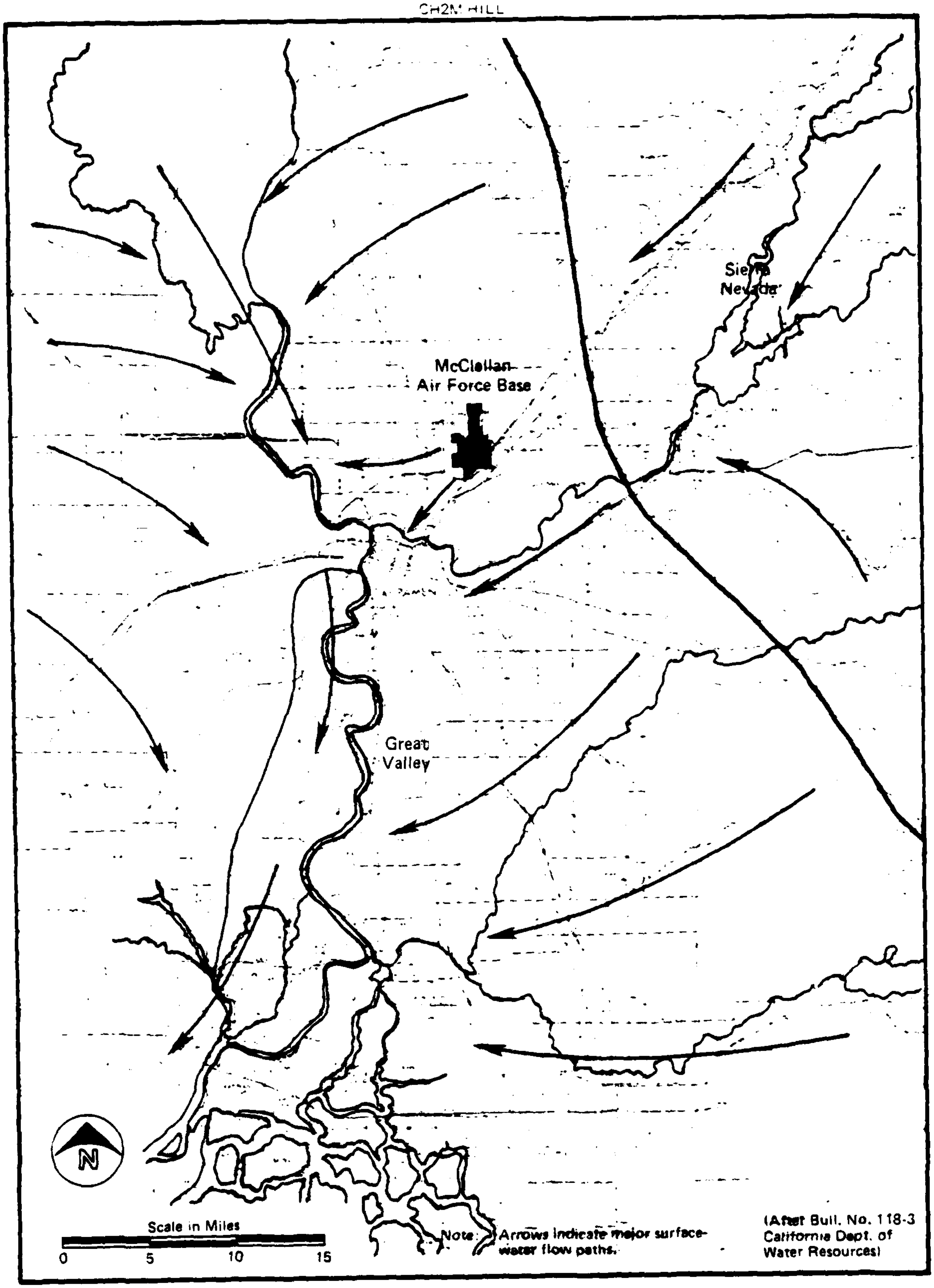

FIGURE 4. Physiographic map.

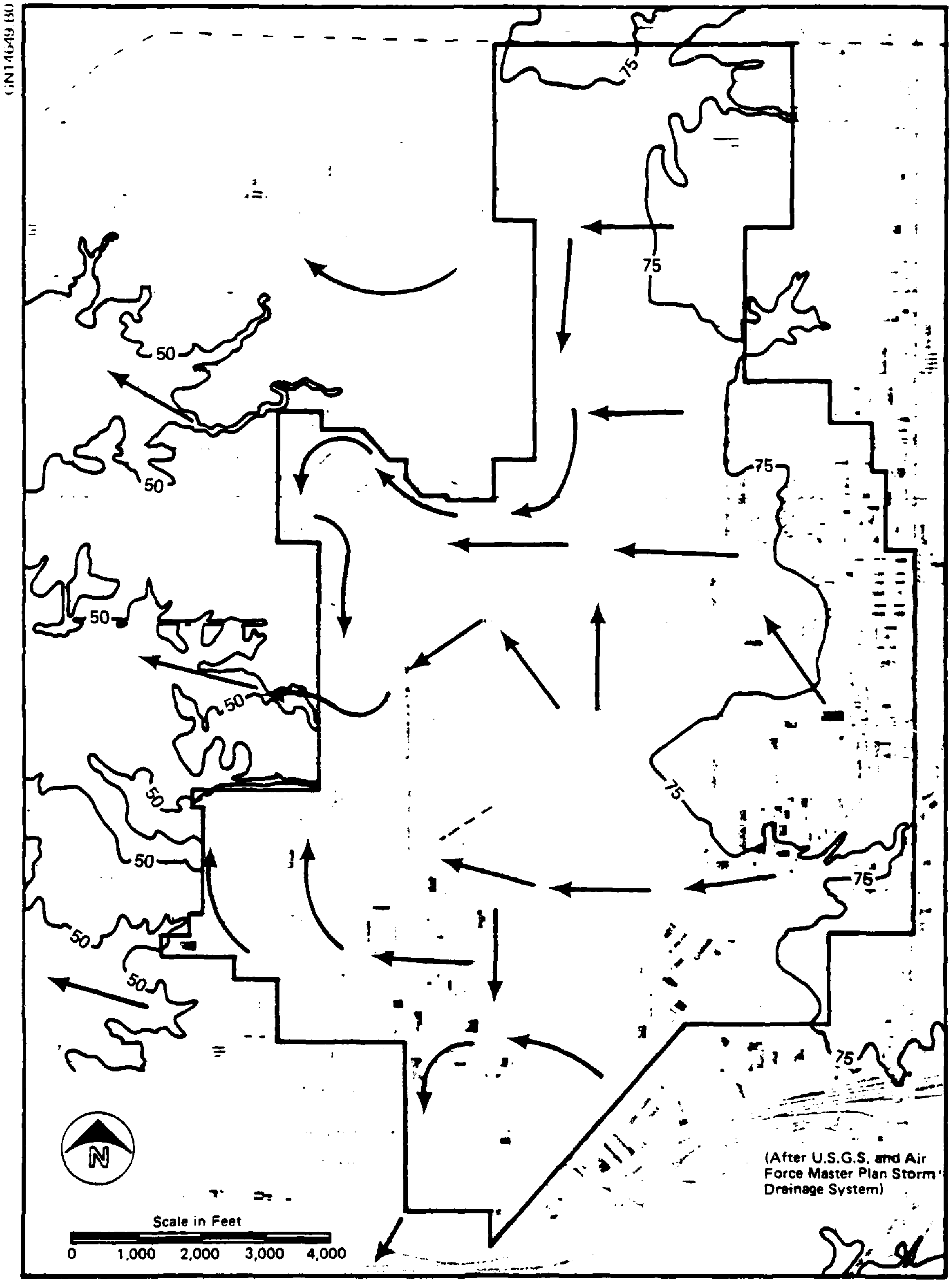

FIGURE 5. Topography and surface drainage.

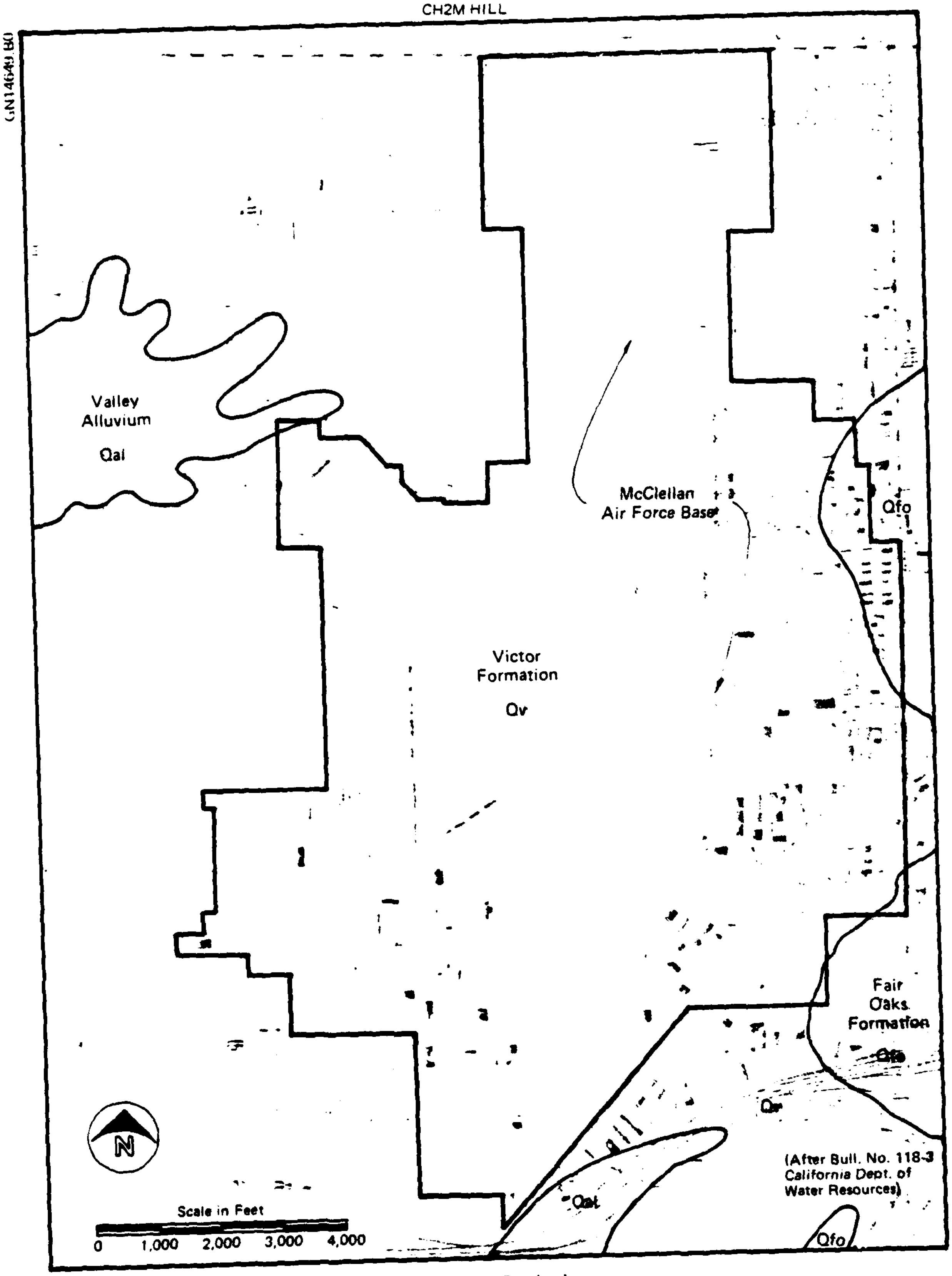

FIGURE 6. Geologic map.

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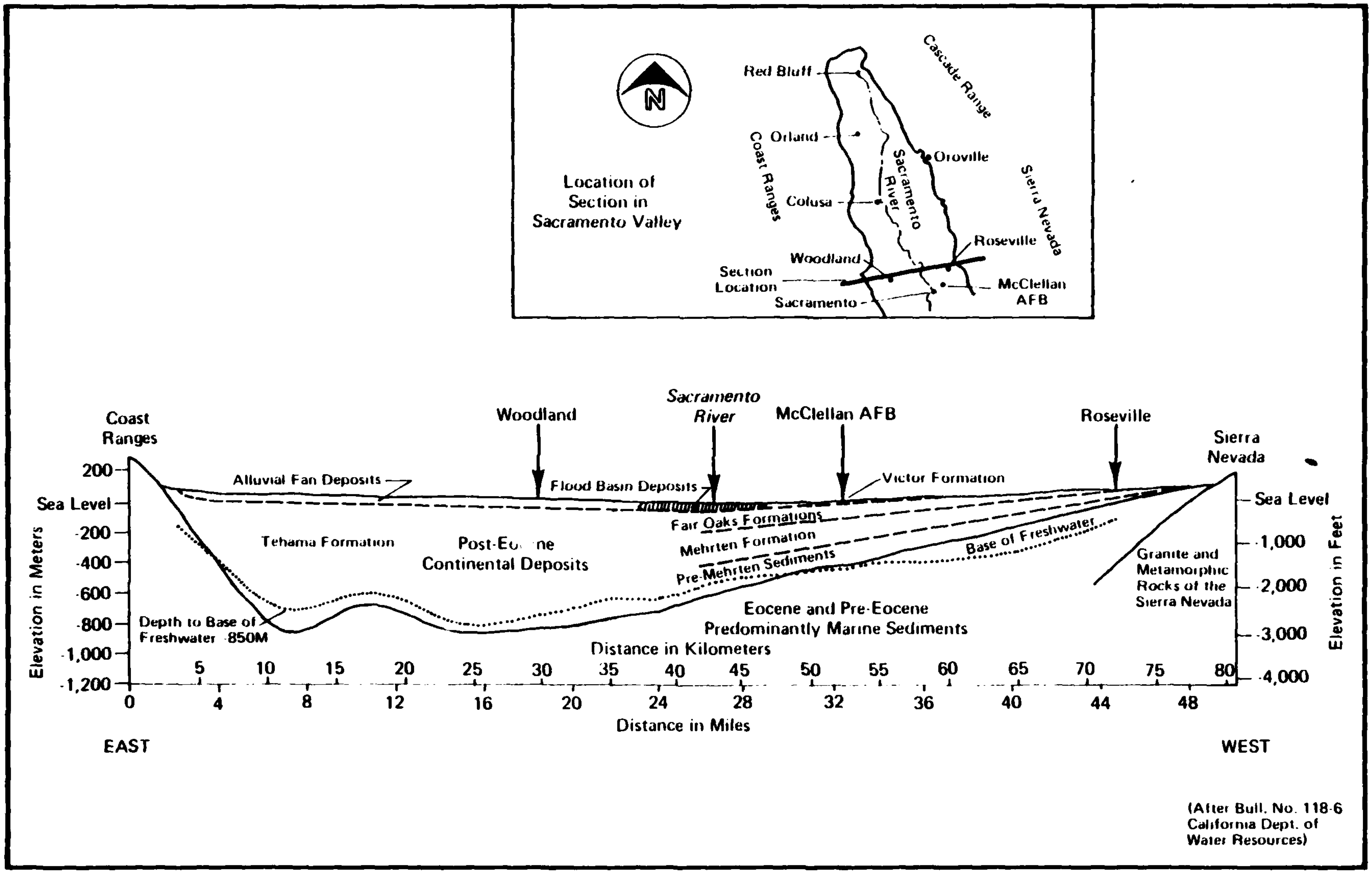

FIGURE 7. Generalized east-west geologic section in the vicinity of McClellan AFB.

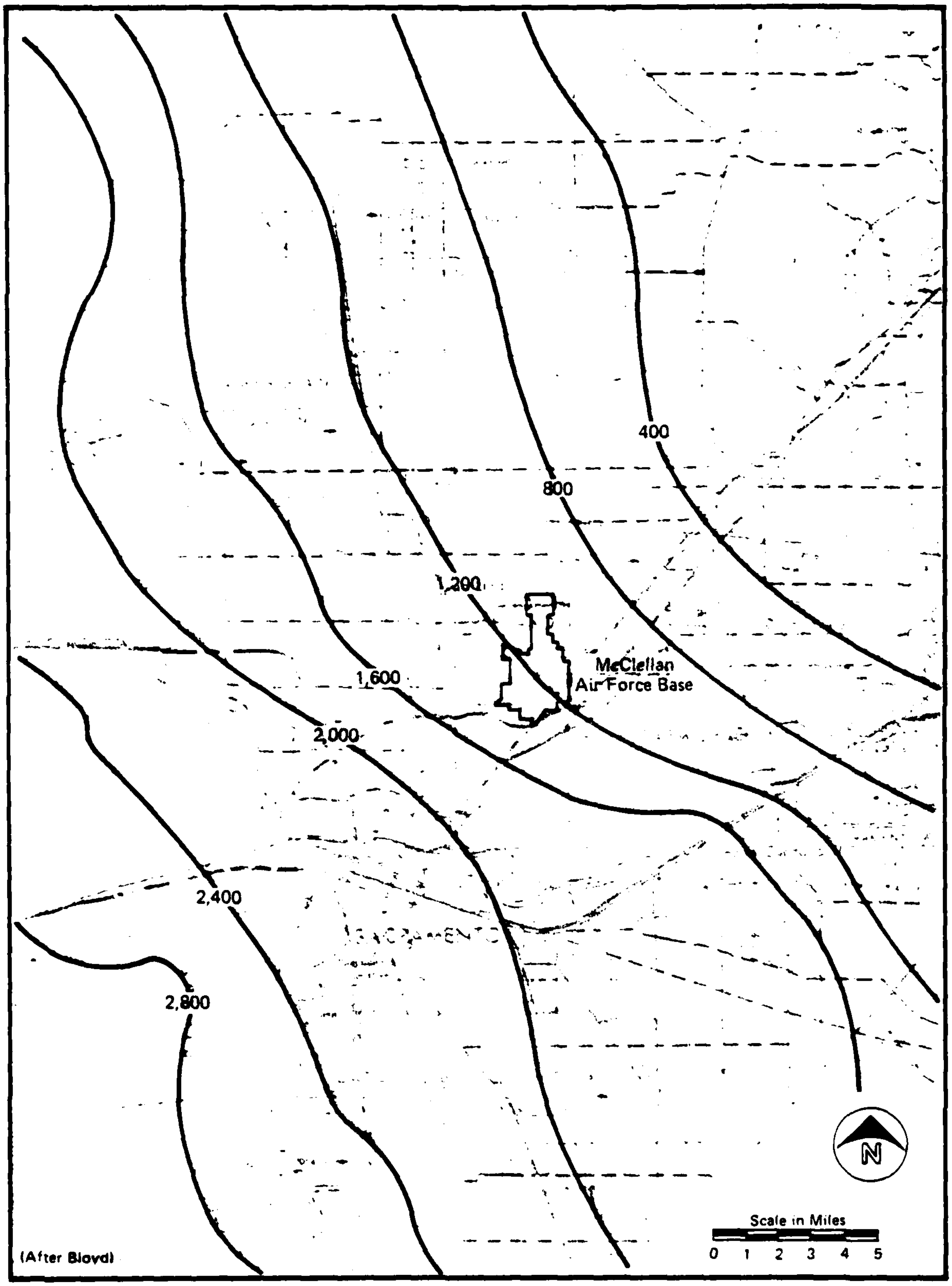

FIGURE 8. Thickness of the Post-Eocene continental deposits in the vicinity of McClellan AFB.

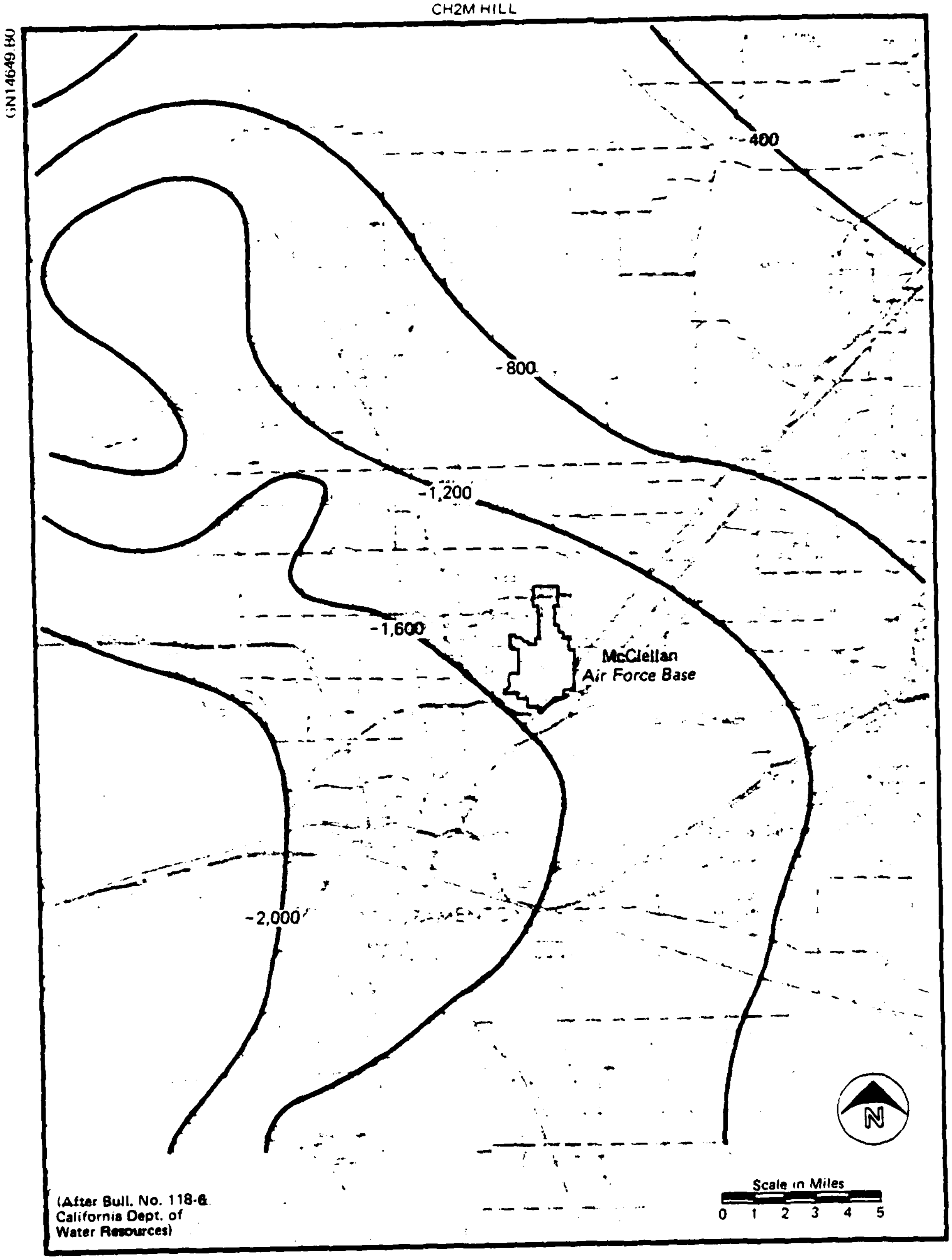

FIGURE 9. Elevation (below mean sea level) of the base of fresh ground water in the vicinity of McClellan AFB.

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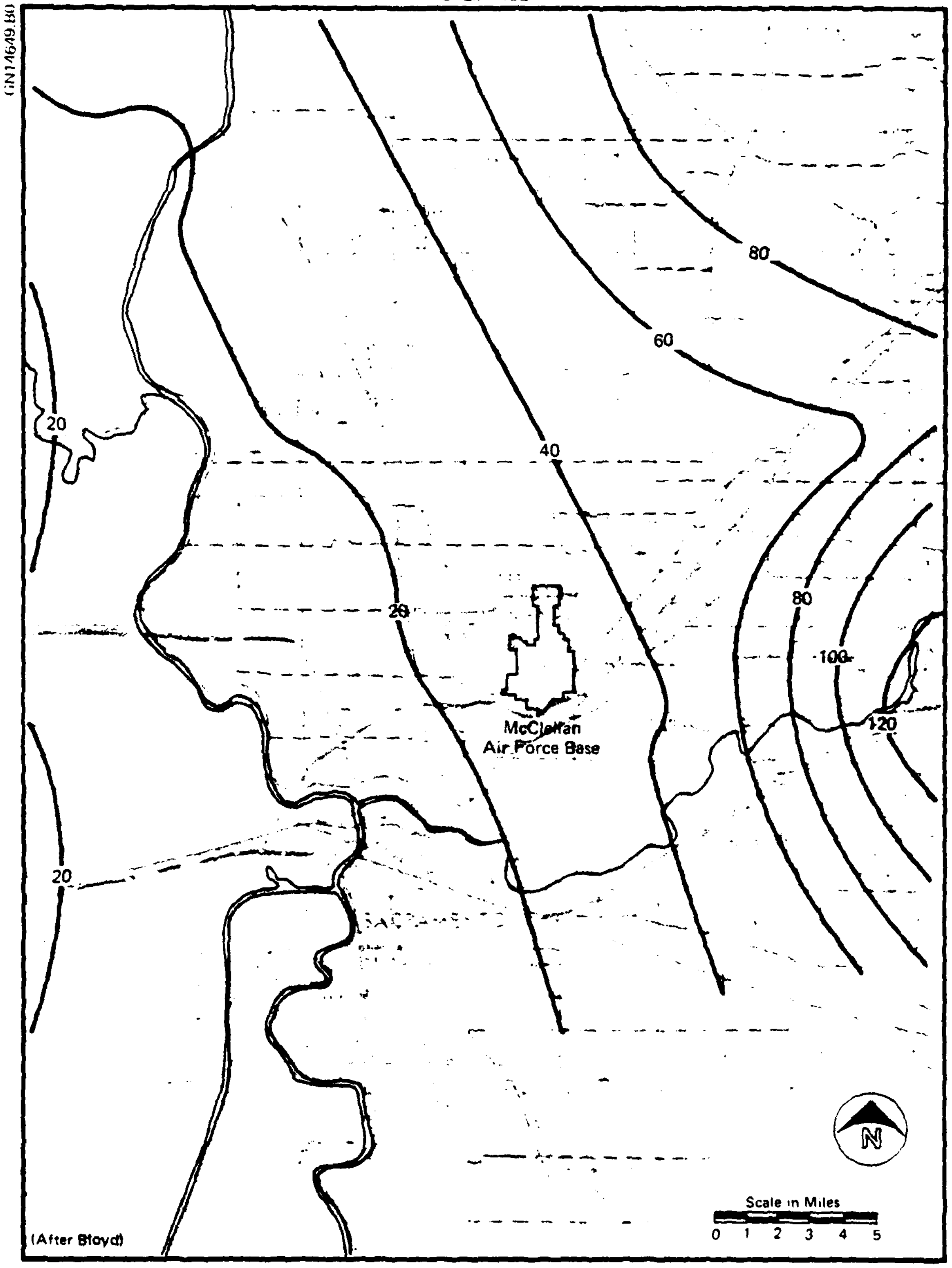

FIGURE 10. Ground-water contours (above mean sea level) in the vicinity of McClellan AFB, Spring 1912.

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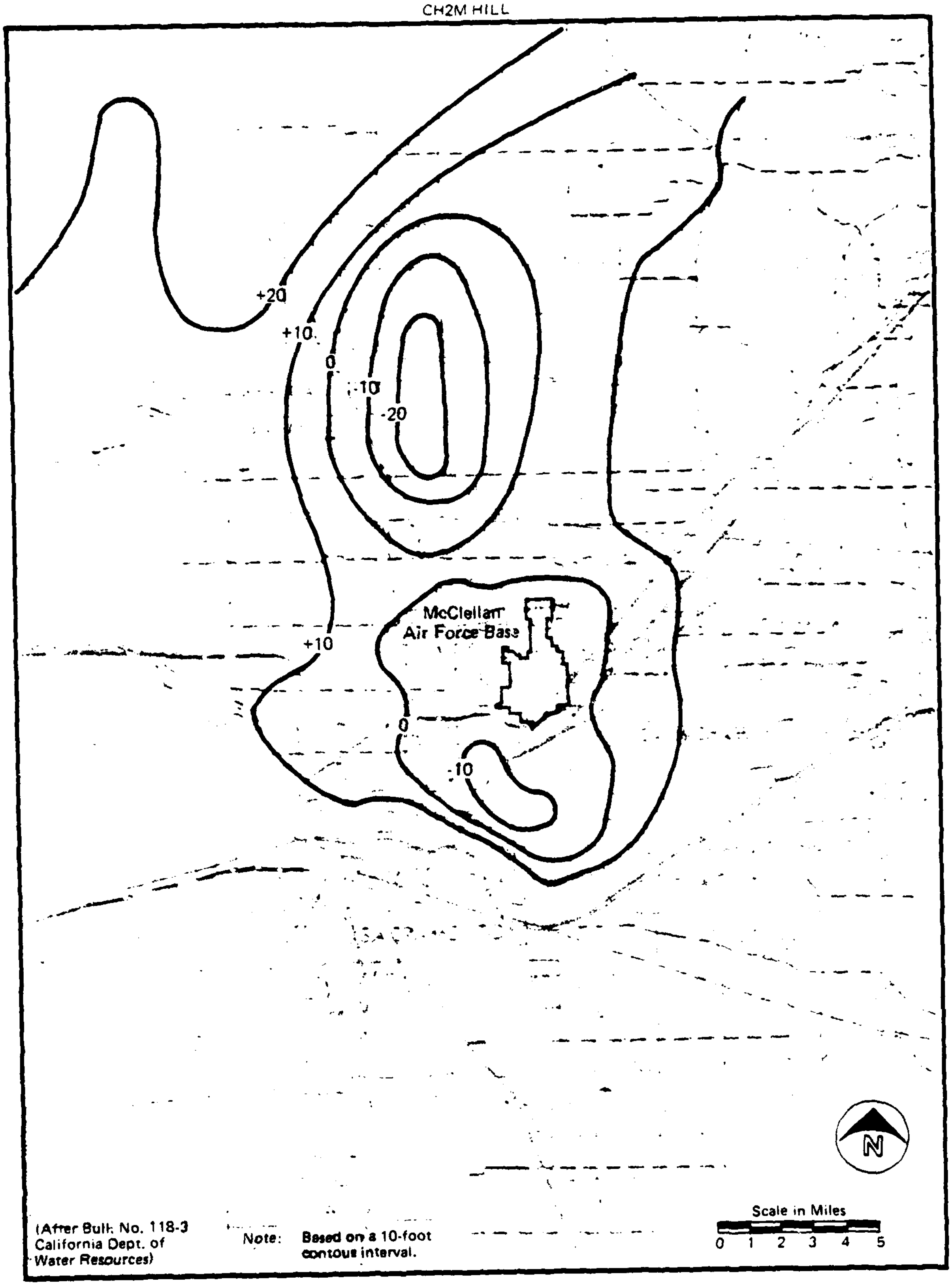

FIGURE 11. Ground-water controus (above mean sea level) in the vicinity of McClellan AFB, Spring 1968.

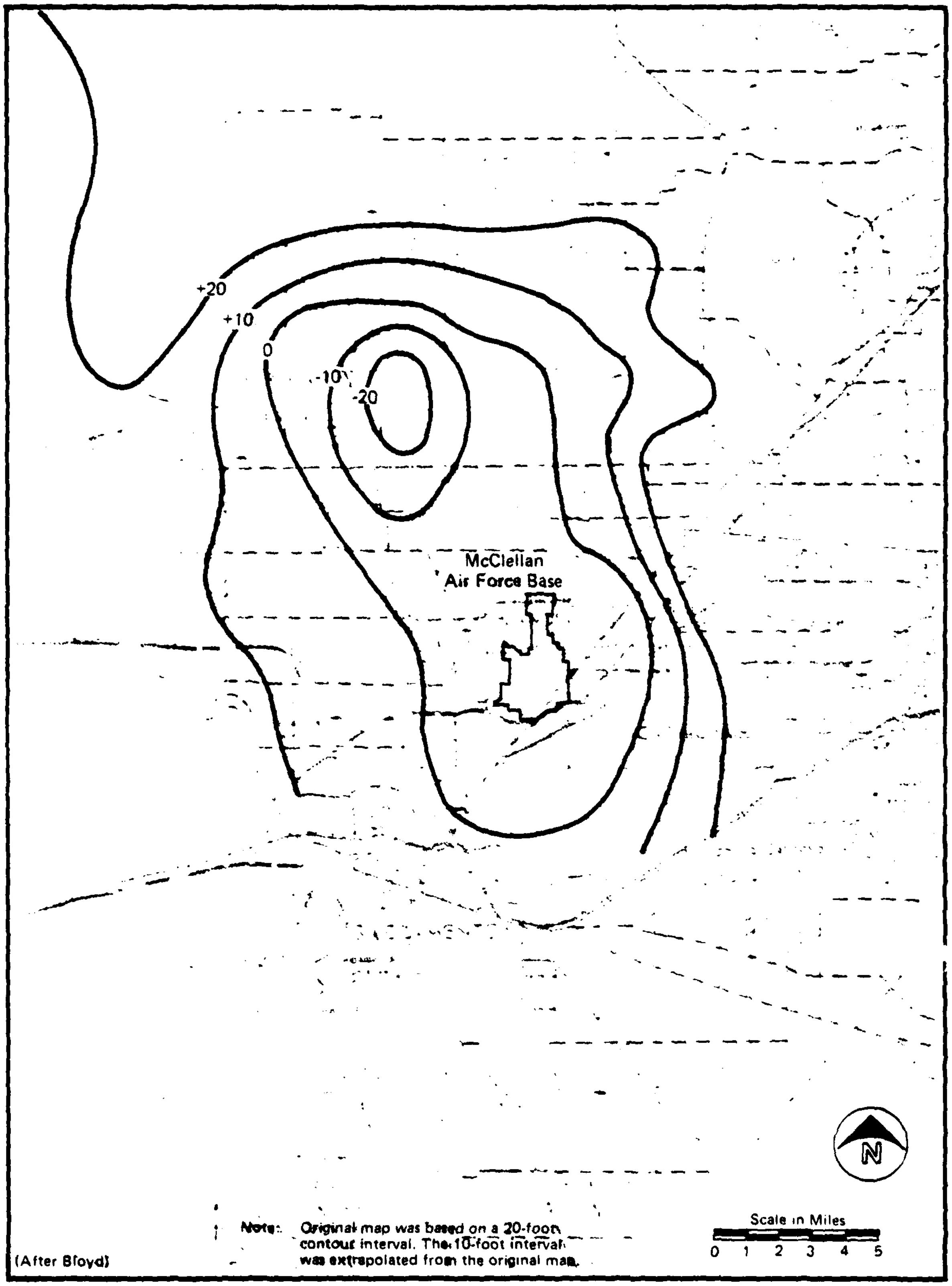

FIGURE 12. Ground-water contours (above mean sea level) in the vicinity of McClellan AFB, Spring 1971.

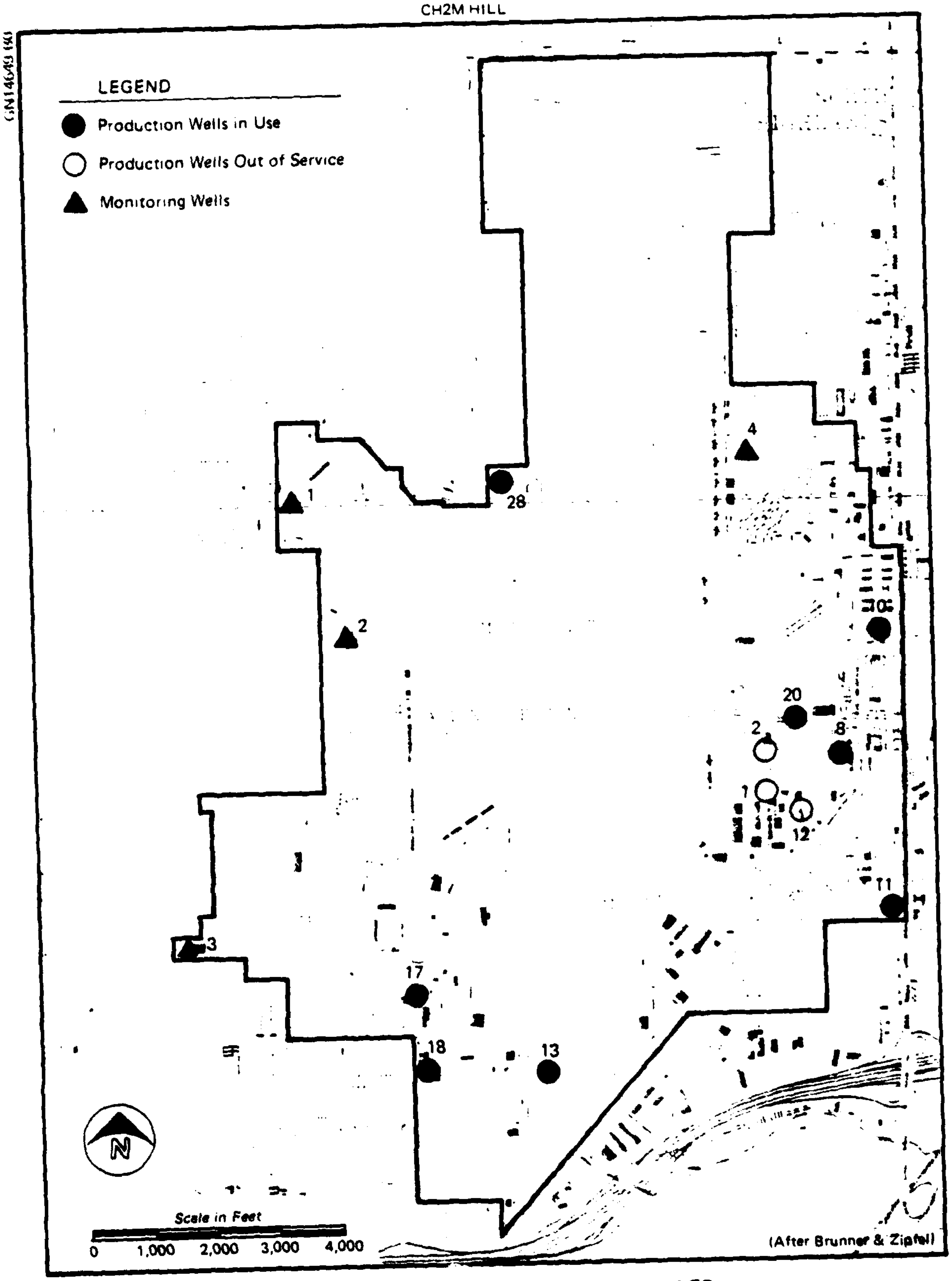

FIGURE 13. Well location map, McClellan AFB.

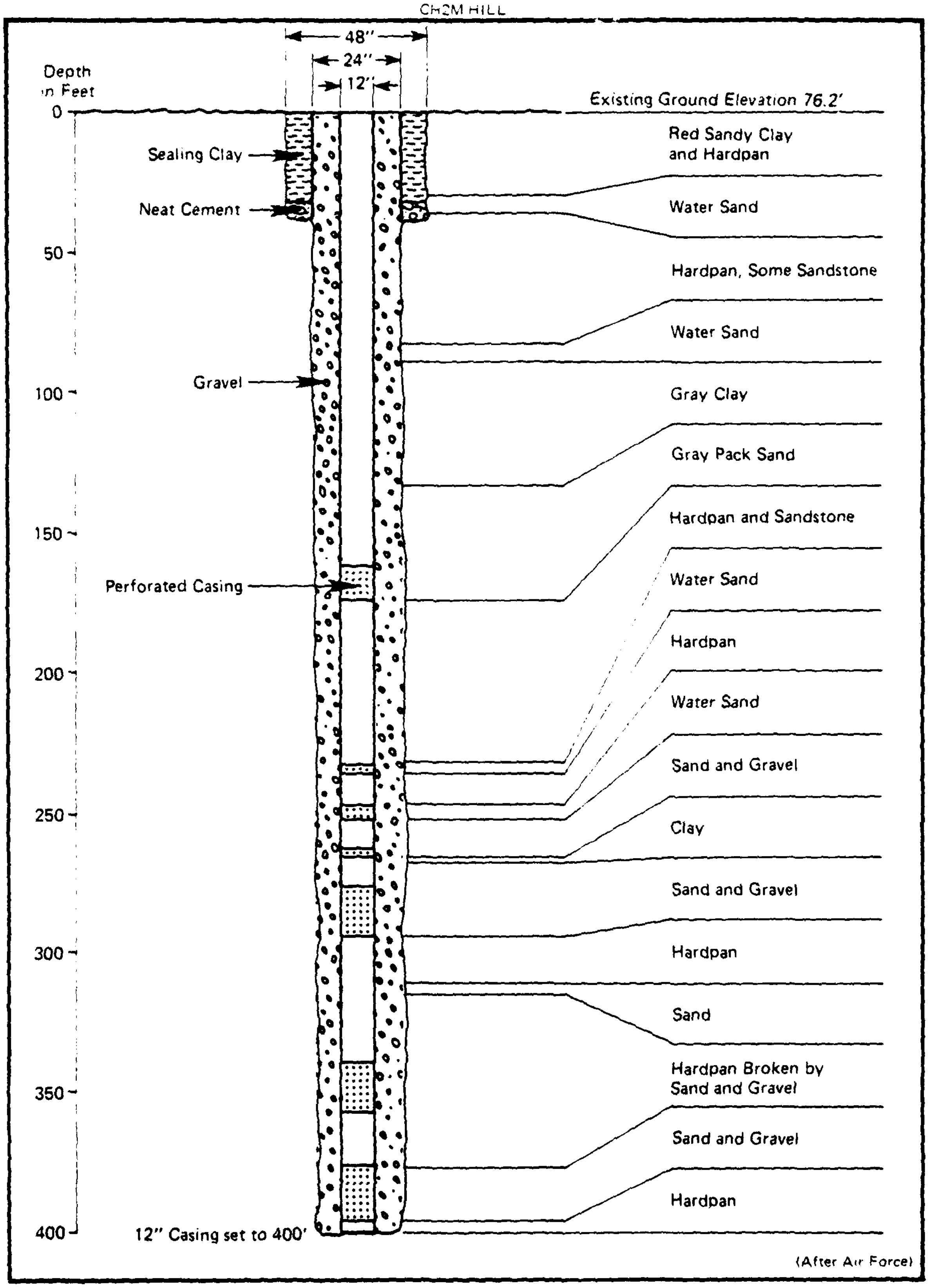

FIGURE 14. Log and well construction details of Well No. 1 at McClellan AFB.

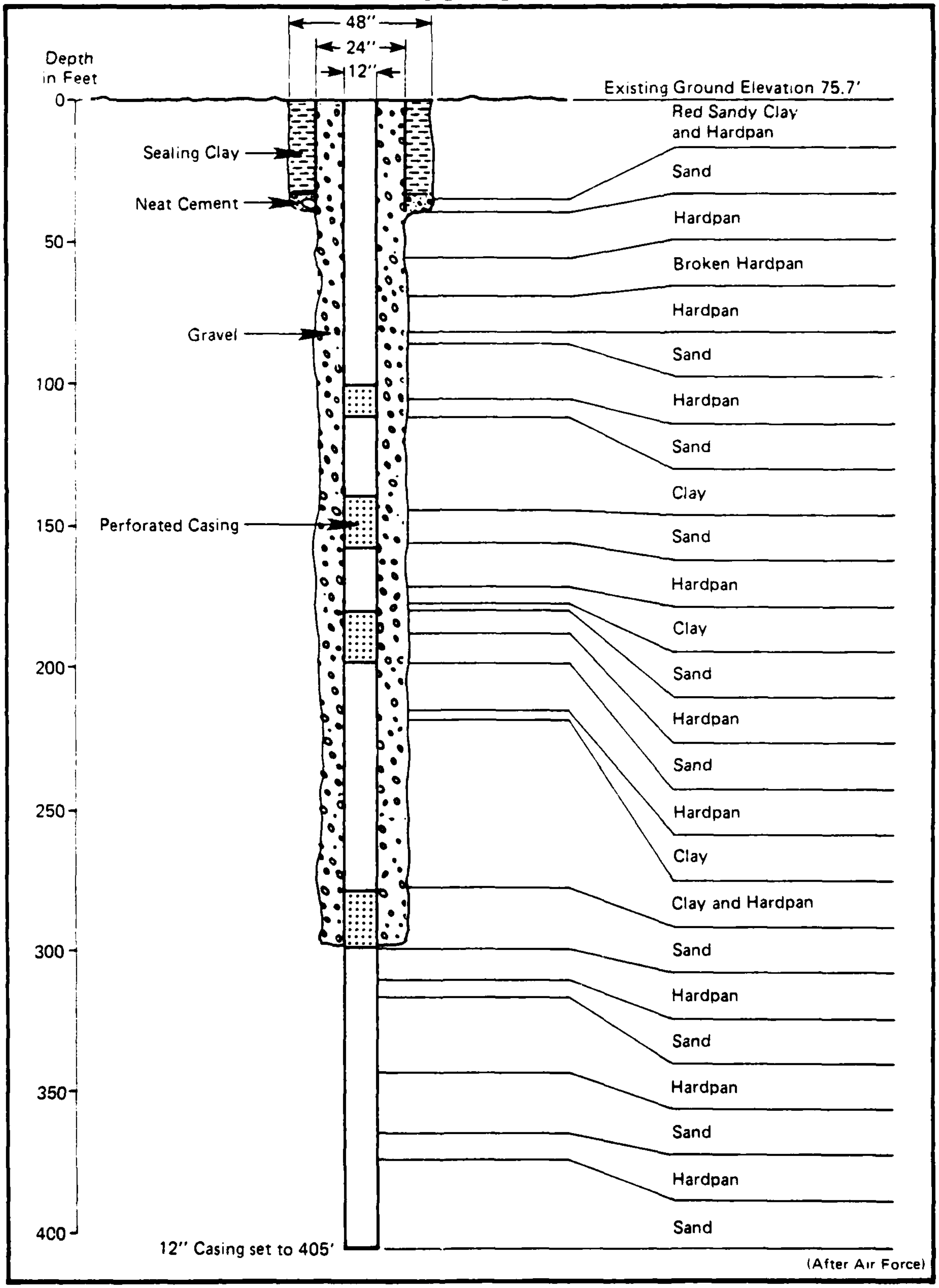

FIGURE 15. Log and well construction details of Well No. 2 at McClellan AFB.

CH2M HILL

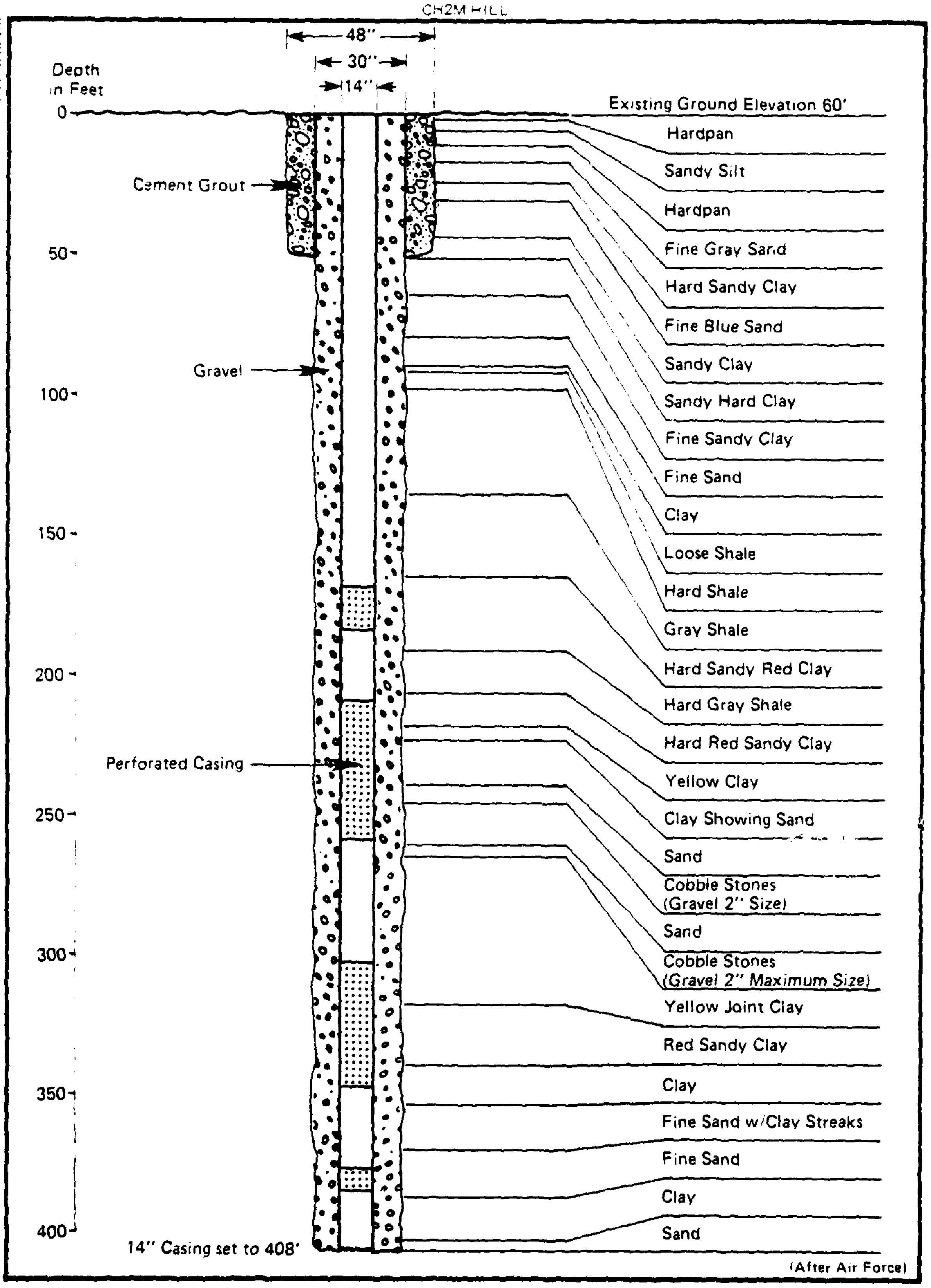

FIGURE 17. Log and well construction details of Well No. 18 at McClellan AFB.

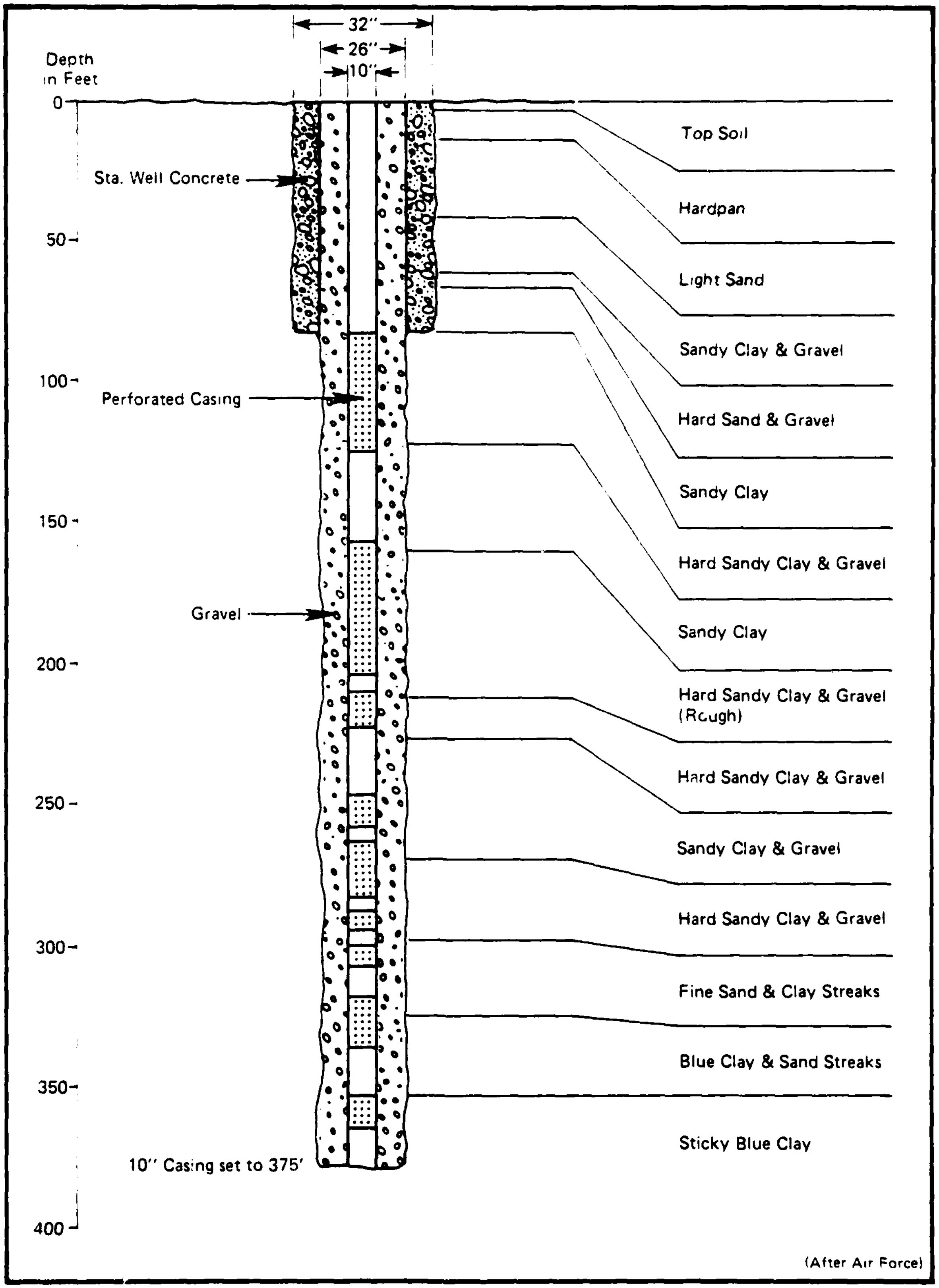

FIGURE 18. Log and well construction details of Well No. 1 at the Lincoln site.

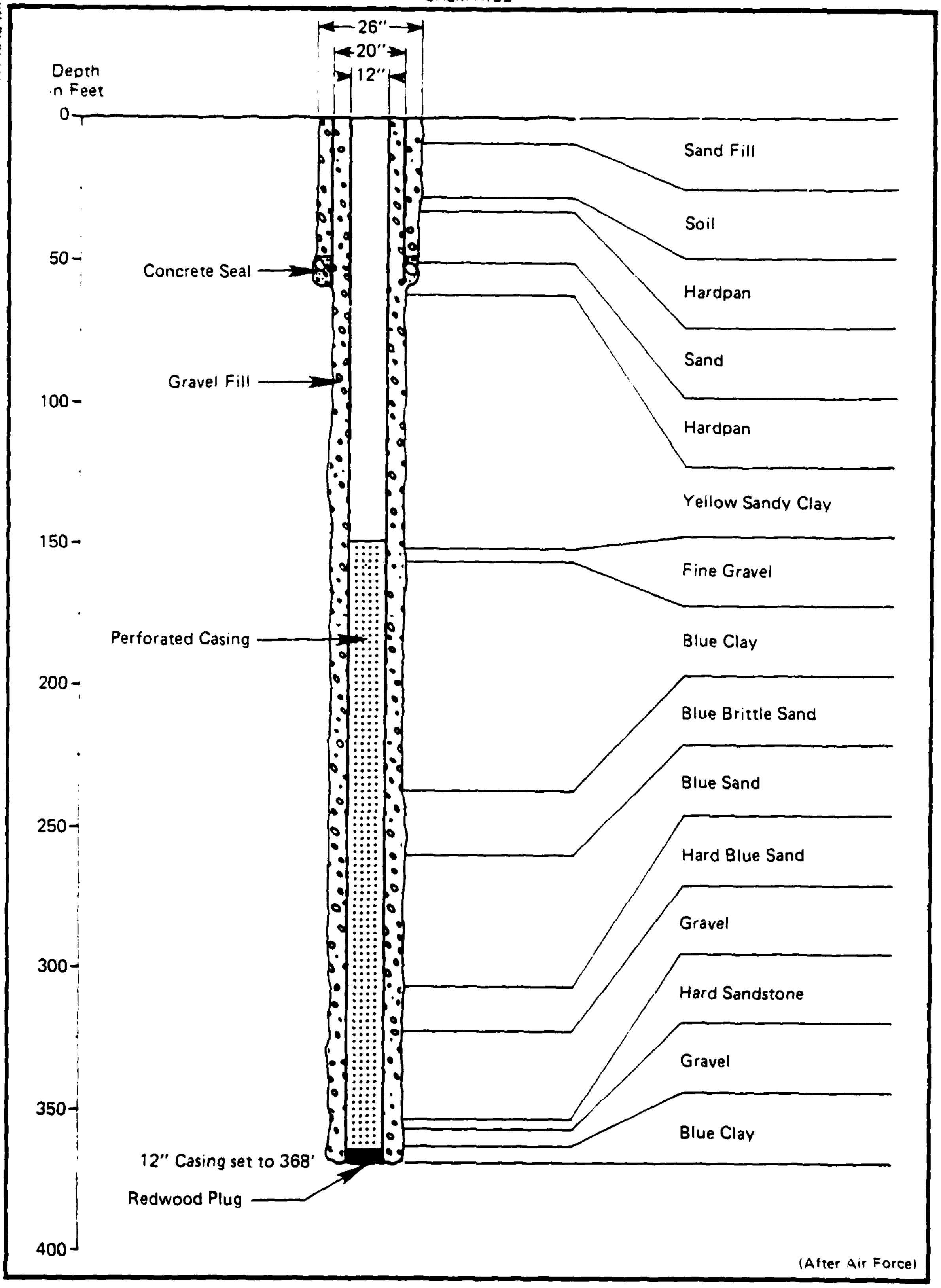

FIGURE 19. Log and well construction details of the River Dock Well.

GN14649 B0

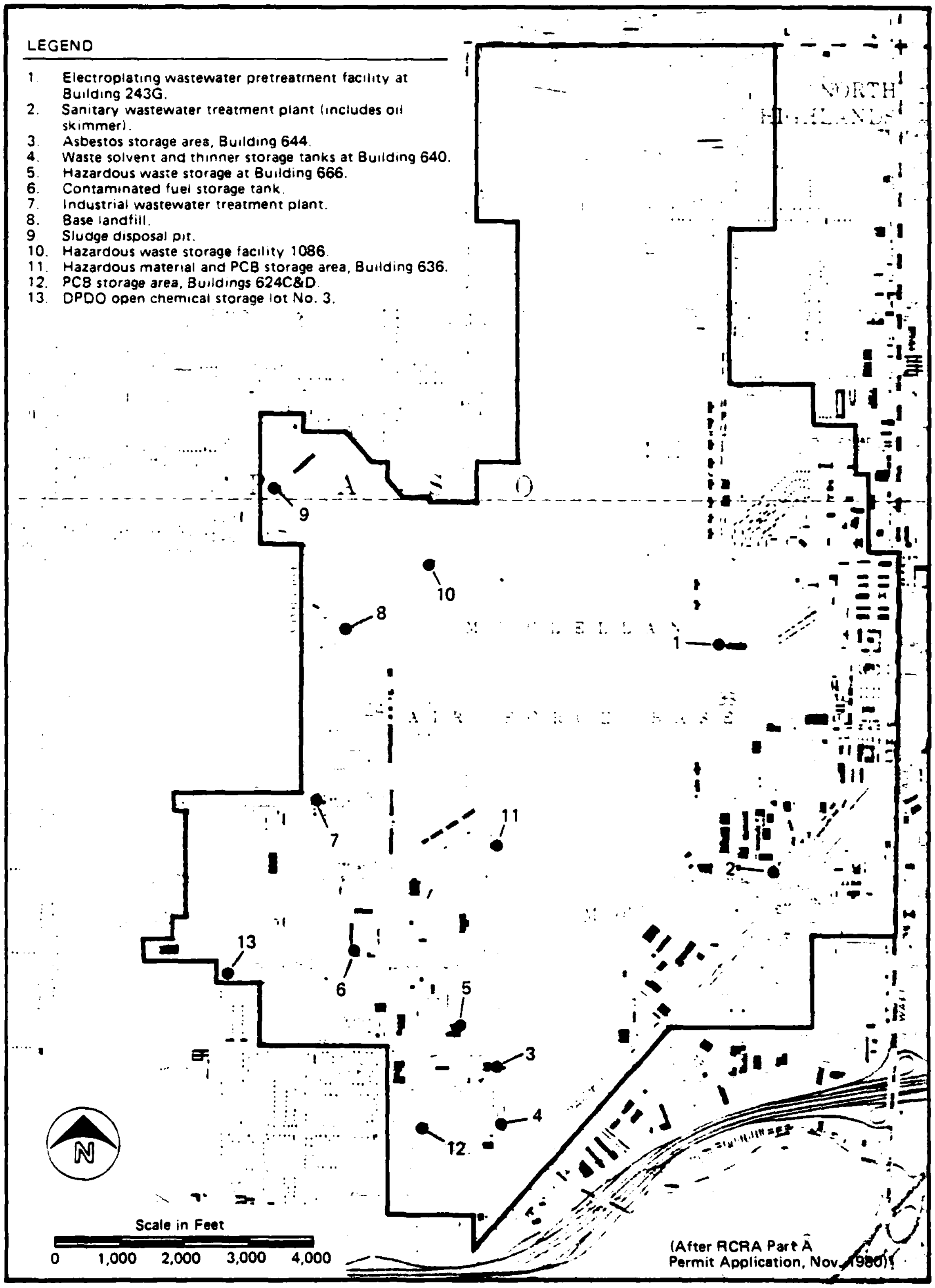

FIGURE 20. Locations of hazardous waste treatment, storage, and disposal facilities at McClellan AFB.

GN14649.B0

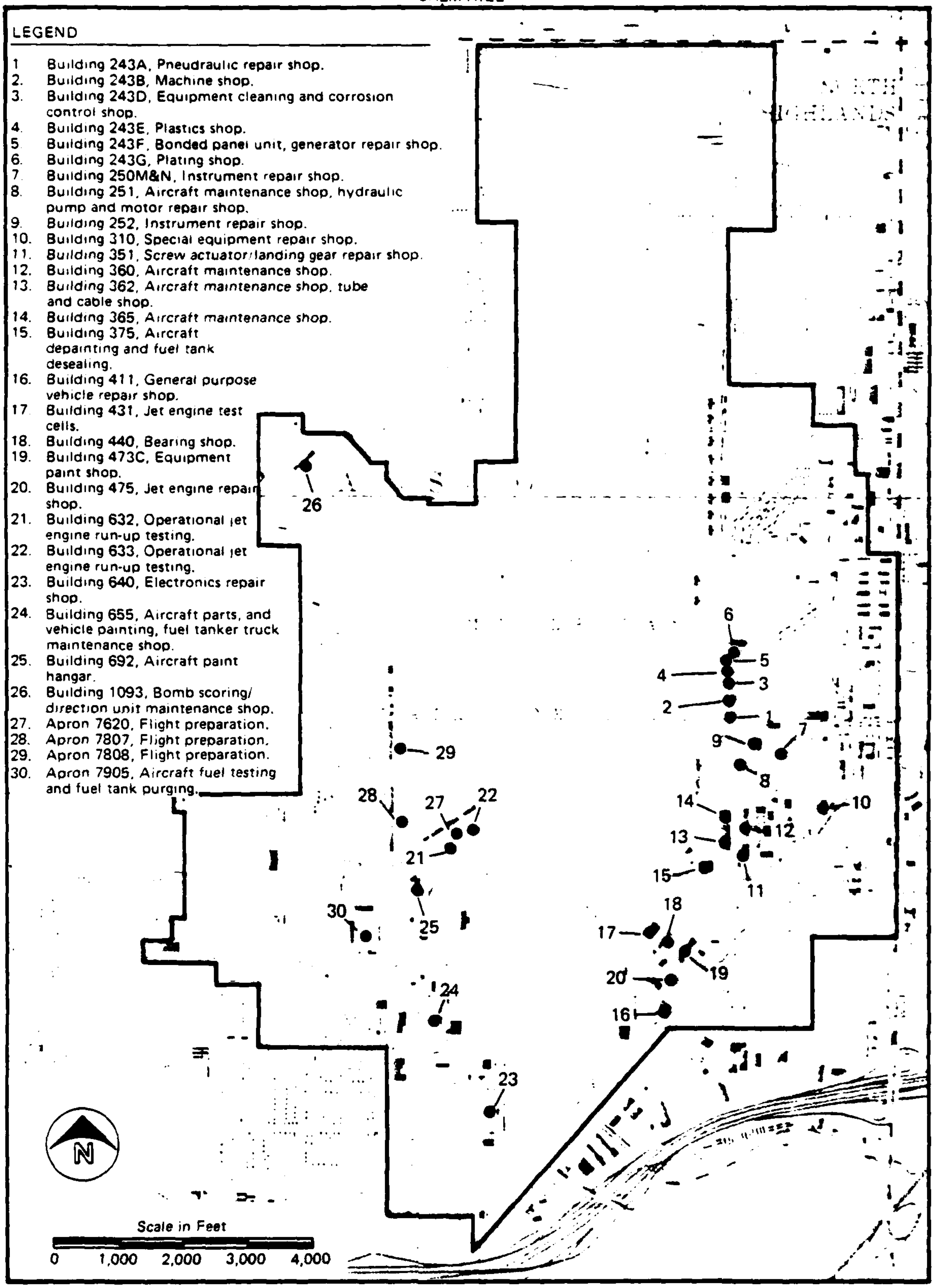

FIGURE 21. Locations of major industrial facilities at McClellan AFB.

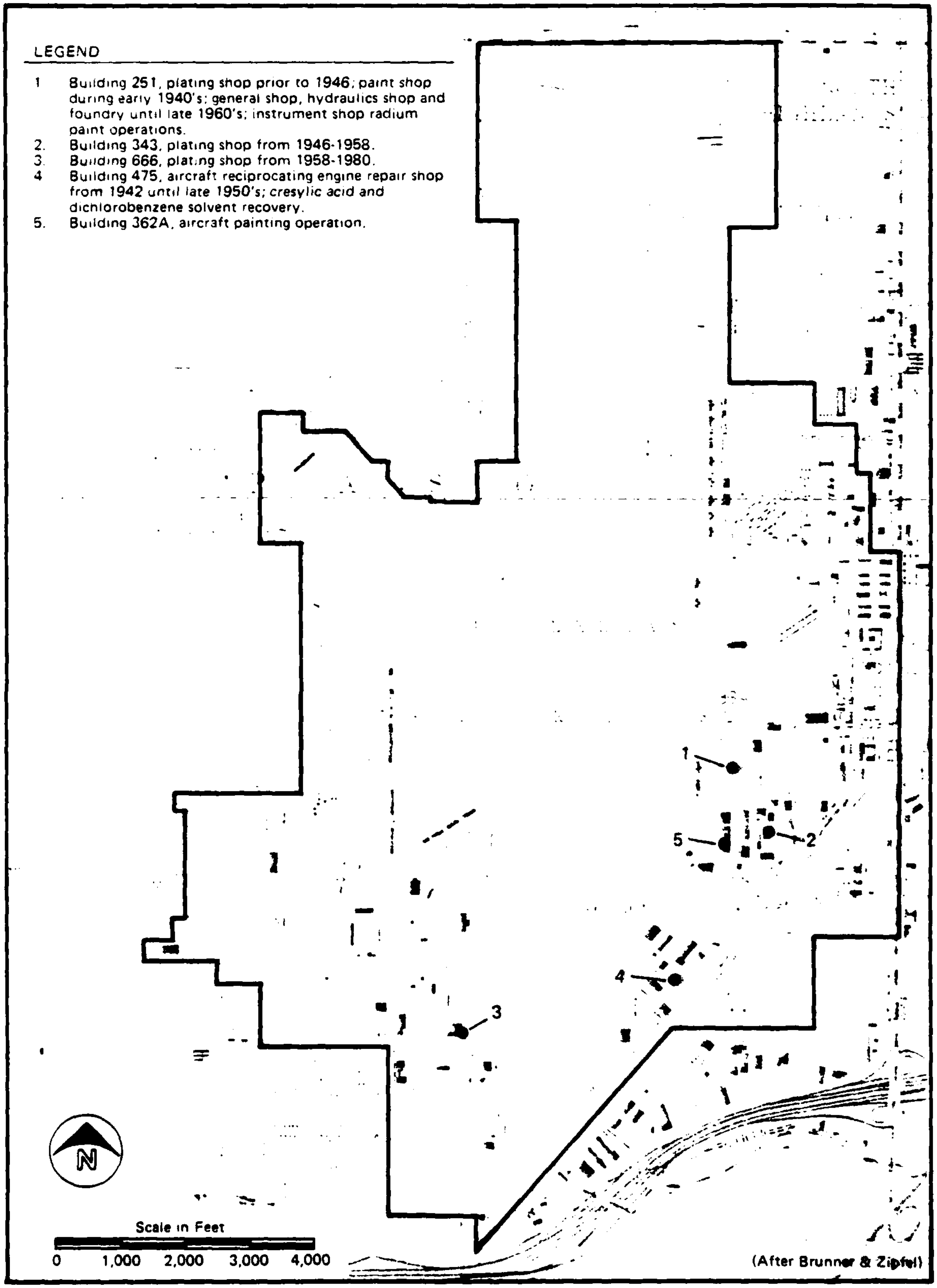

FIGURE 22. Locations of past major industrial operations at McClellan AFB.

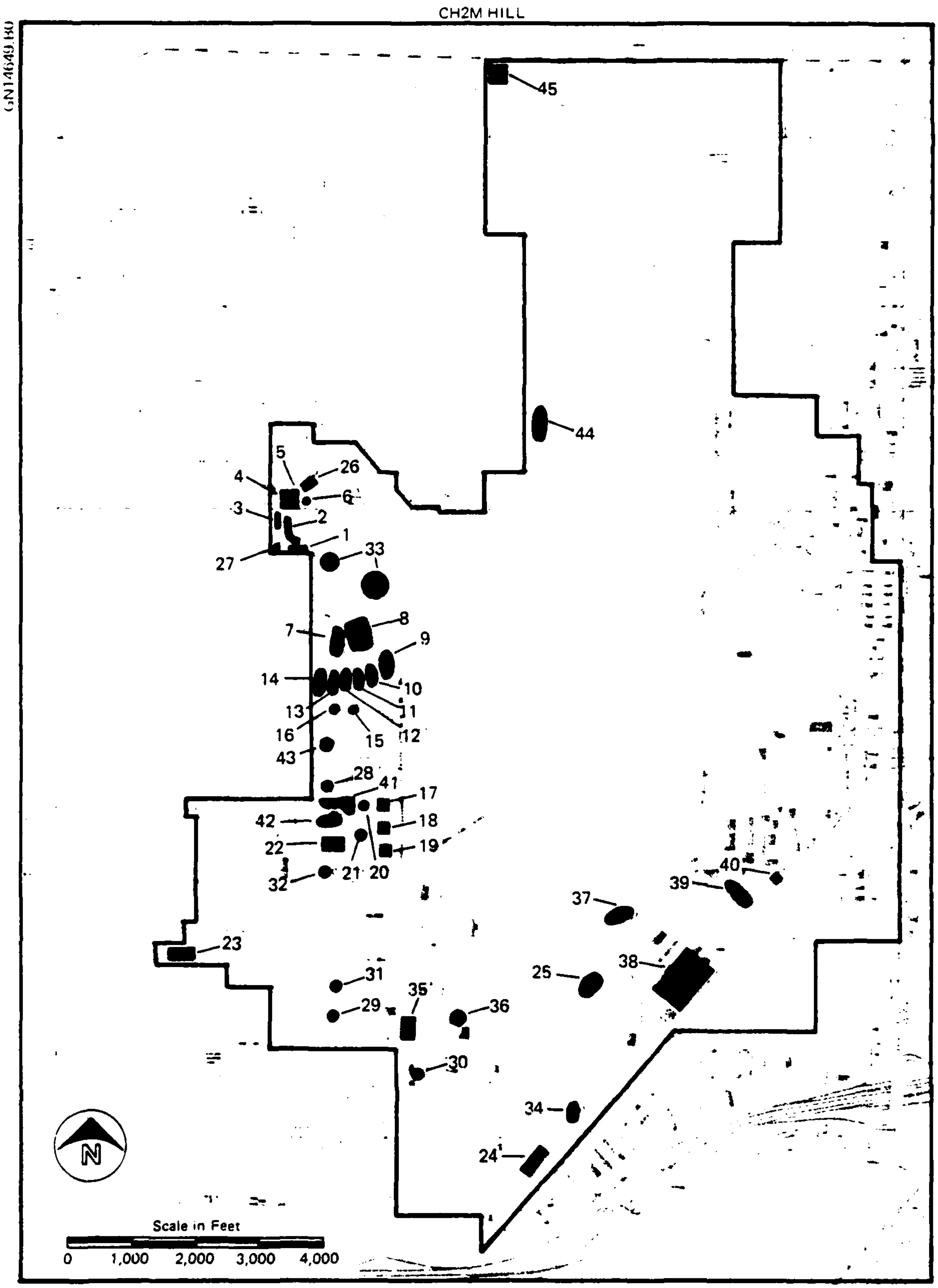

FIGURE 23. Location of past disposal sites and possible contaminated areas at McClellan AFB.

LEGEND

1. Burning/burial pit, 1959 to 1962.
2. Sludge/oil pit, 1962 to 1979.
3. Sludge/burning/burial pit, 1962 to 1965.
4. Sludge/oil pit, 1967 to present.
5. Sludge/oil pit, 1972 to 1978.
6. Oil burn pit, 1972 to 1978.
7. Sludge/oil pit, 1966 to 1967.
8. Sludge/burial pit 1974 to 1981.
9. Burial pit, pre-1949 to 1953.
10. Burial pit, 1953 to 1955.
11. Burial pit, 1955 to 1957.
12. Burial pit, 1967 to 1969.
13. Burial pit, 1969 to 1971.
14. Burial pit, 1971 to 1974.
15. Sodium valve trench, 1940 to 1950.
16. Sodium valve trench, 1940 to 1950.
17. Burial pit, 1957 to 1959.
18. Burial pit, 1957 to 1959.
19. Burial pit, 1957 to 1959.
20. Sludge/oil pit, 1956 to 1957.
21. Sludge/oil pit, 1956 to 1957
22. Burning pit/teepee burner/burial pit, 1946 to 1968.
23. Burial pit, 1966 to 1969 (material removed in 1970).
24. Burning/burial pit, 1964 to 1969.
25. Burial pit, 1940's and early 1950's
26. Sludge pit, early 1960's.
27. Sodium valve trench, late 1940's and early 1950's.
28. Creek debris sludge pit, pre-1972.
29. Civil engineering reclamation yard and scrap material burner, 1950's and 1960's.
    Generator burial pit, 1974.
    Past transformer storage area.
30. 1155th Surface disposal site, late 1950's to present.
31. Refuse incinerator, 1963 to 1968.
32. Radioactive/hazardous wastes storage, pre-1963 to 1975.
33. Industrial sludge landfarm, 1972 (temporary).
34. Waste solvent storage tanks, 1950 to 1953.
35. Scrap metal burial pit, WWII (material removed 1950).
36. Open storage, plating shop materials, 1958 to 1980.
37. Burial pit, early 1950's (material removed 1956).
38. Engine repair shop, carbon removal process, 1950.
39. Burning/burial pit, pre-1941 to 1946.
40. Industrial sludge drying beds, 1955 to 1972.
41. Burial pit, mid-1940's.
42. Oil/burning pits, mid-1940's to 1960's.
43. Burial pit, mid-1940's.
44. Paint Burial Pit, 1950's.
45. PCB Contamination/old salvage yard operation, pre-1972 to 1978.

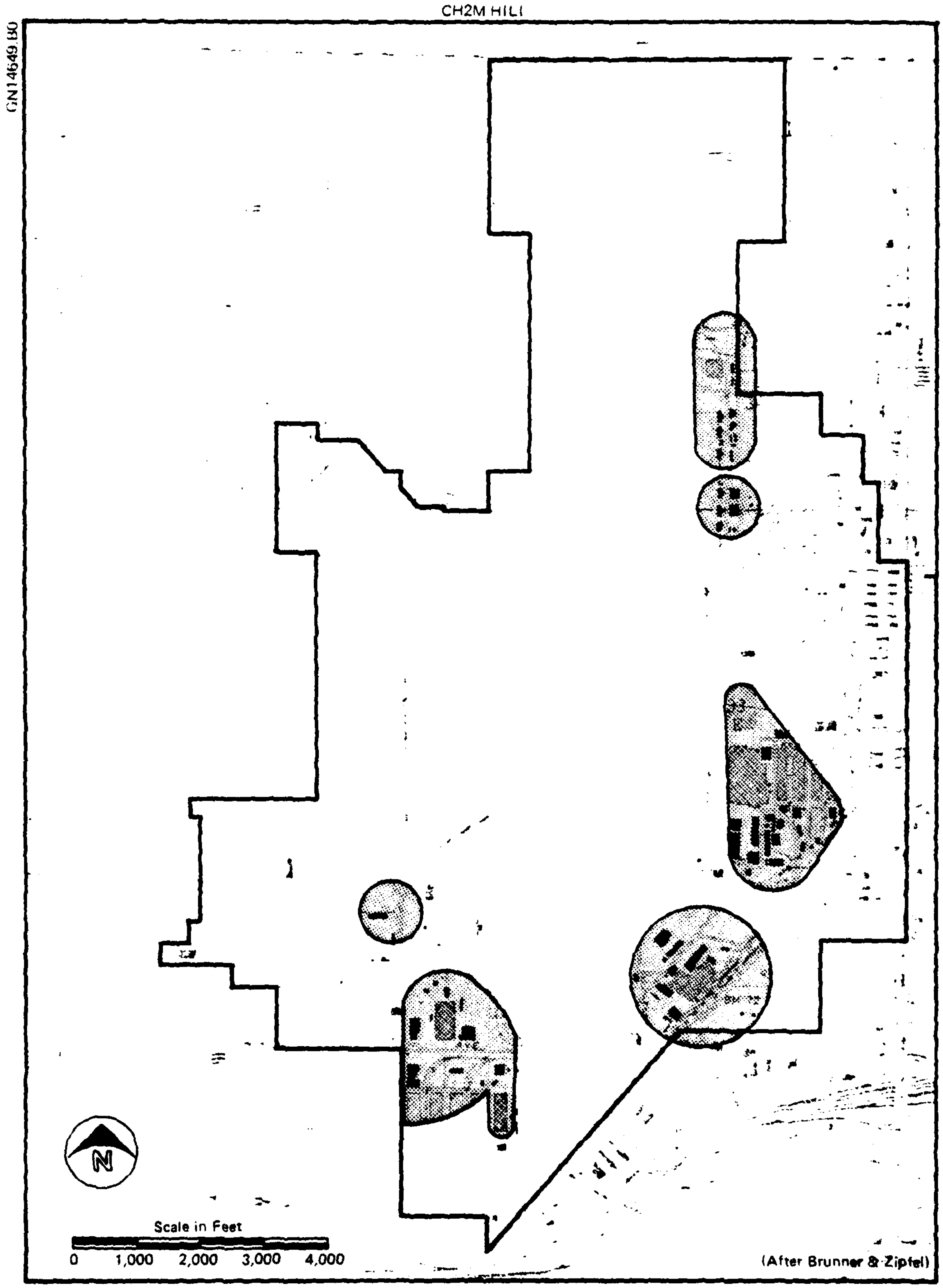

FIGURE 24. Approximate locations of past major TCE usage areas at McClellan AFB.

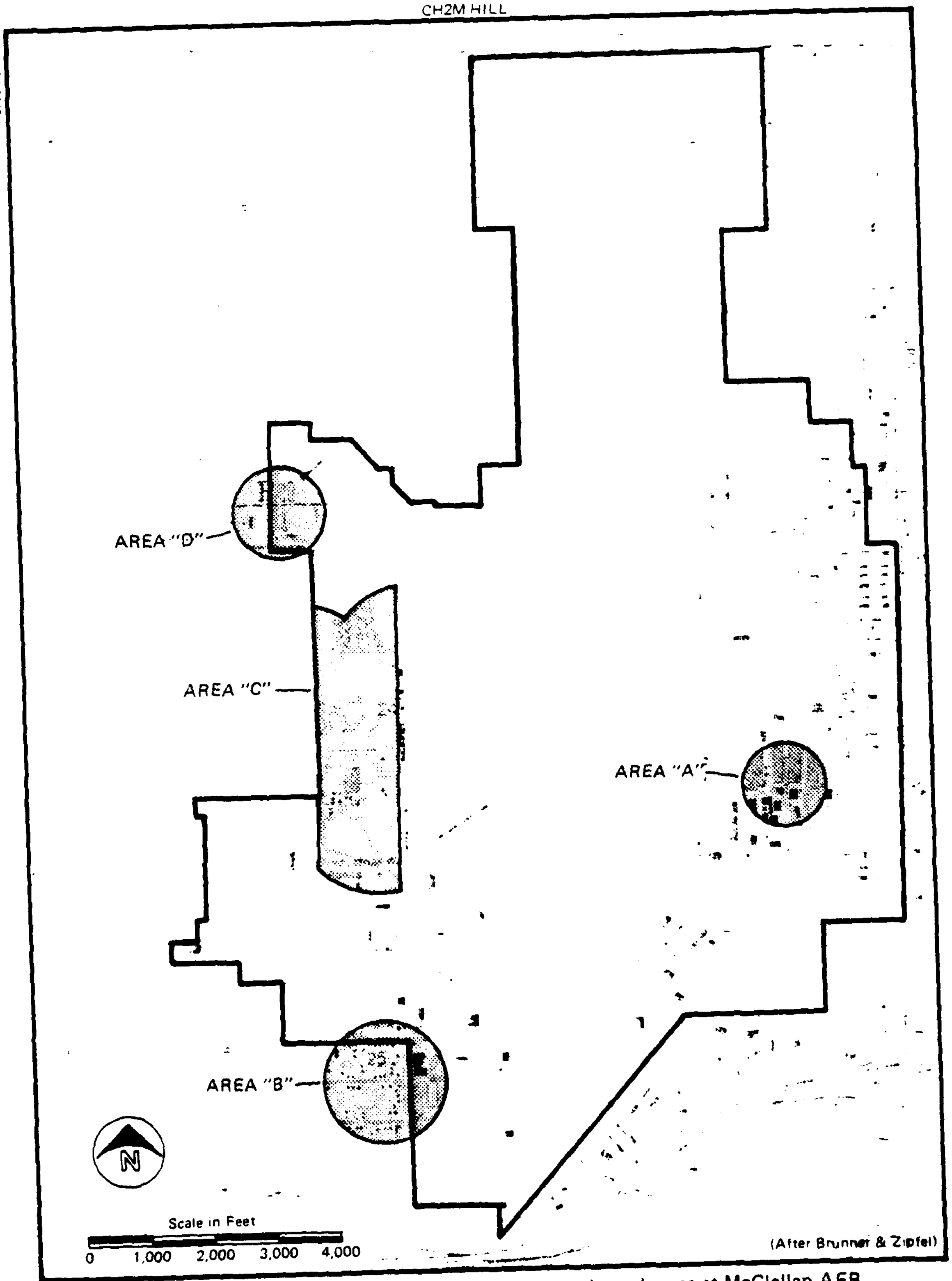

FIGURE 25. Locations of suspected TCE contaminated areas at McClellan AFB.

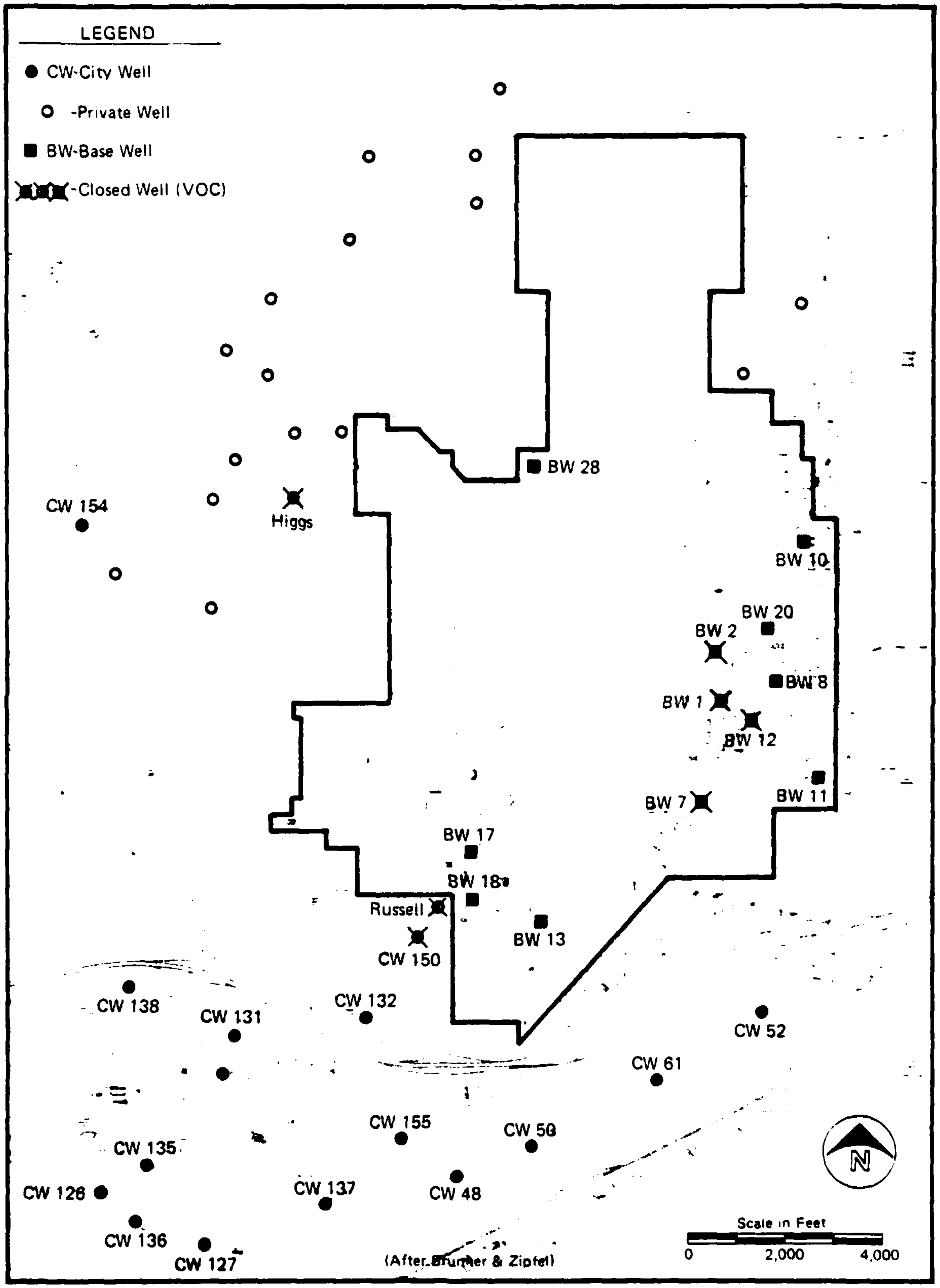

FIGURE 26. Locations of base wells, surrounding offbase city and private wells, and wells closed due to VOC contamination.

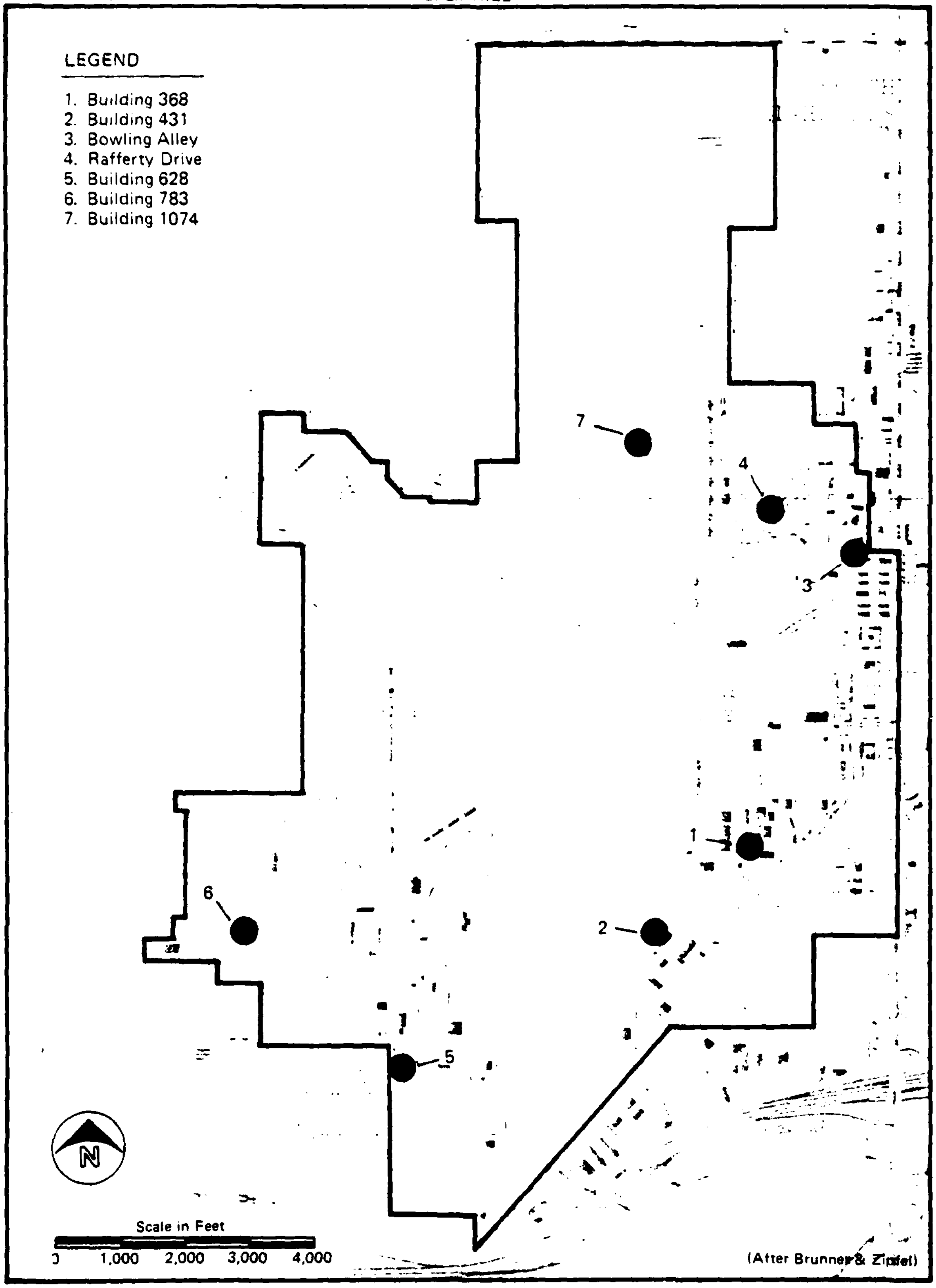

FIGURE 27. Water distribution system sampling points at McClellan AFB.

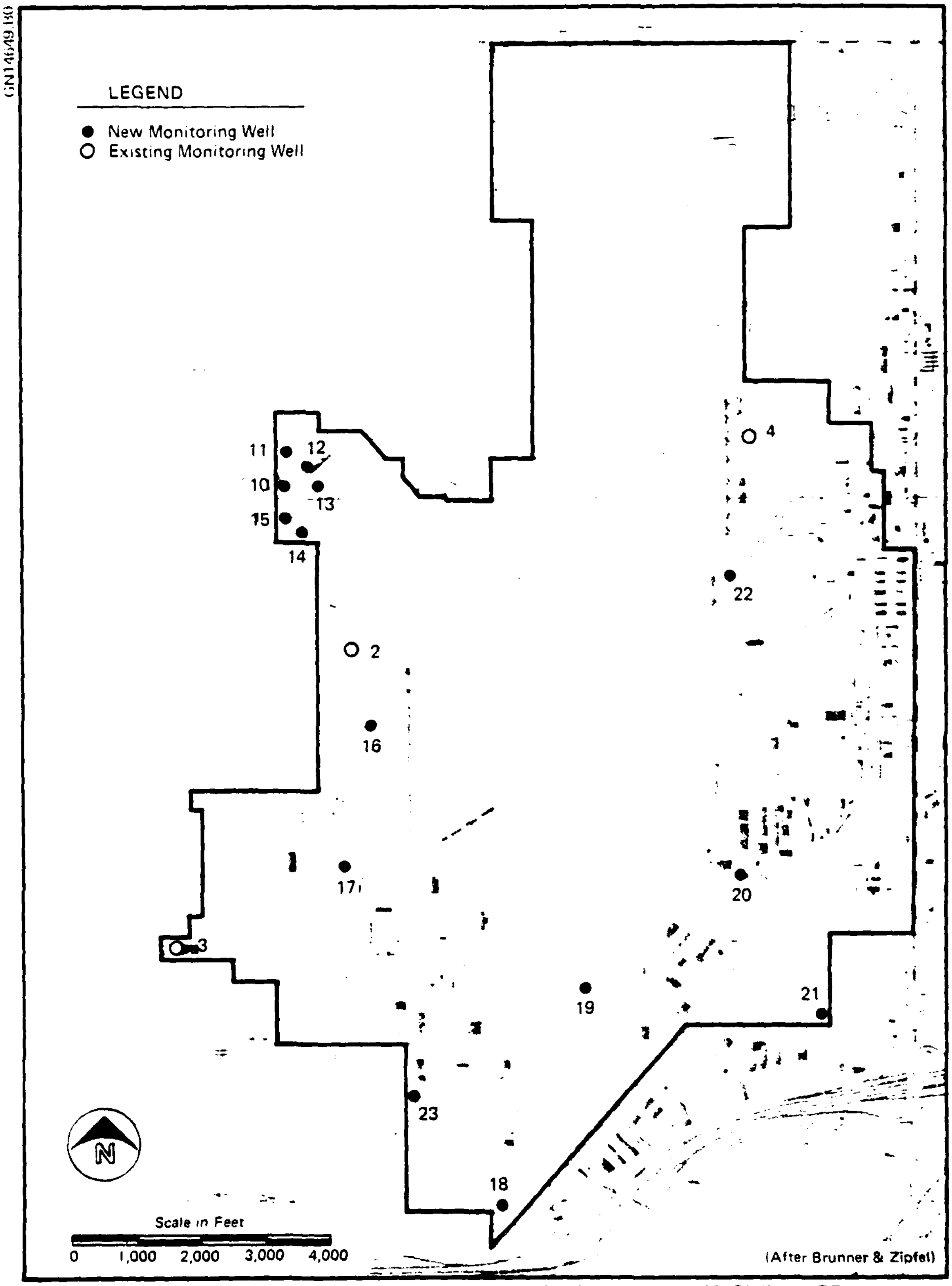

FIGURE 28. Expanded ground-water monitoring system at McClellan AFB.

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REFERENCES

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Appendix A

PHOTOGRAPHS OF McCLELLAN AFB, CAMP KOHLER ANNEX, DAVIS COMMUNICATIONS ANNEX, McCLELLAN STORAGE ANNEX, LINCOLN COMMUNICATIONS ANNEX, SACRAMENTO RIVER DOCK ANNEX, AND CAPEHART FAMILY HOUSING ANNEX

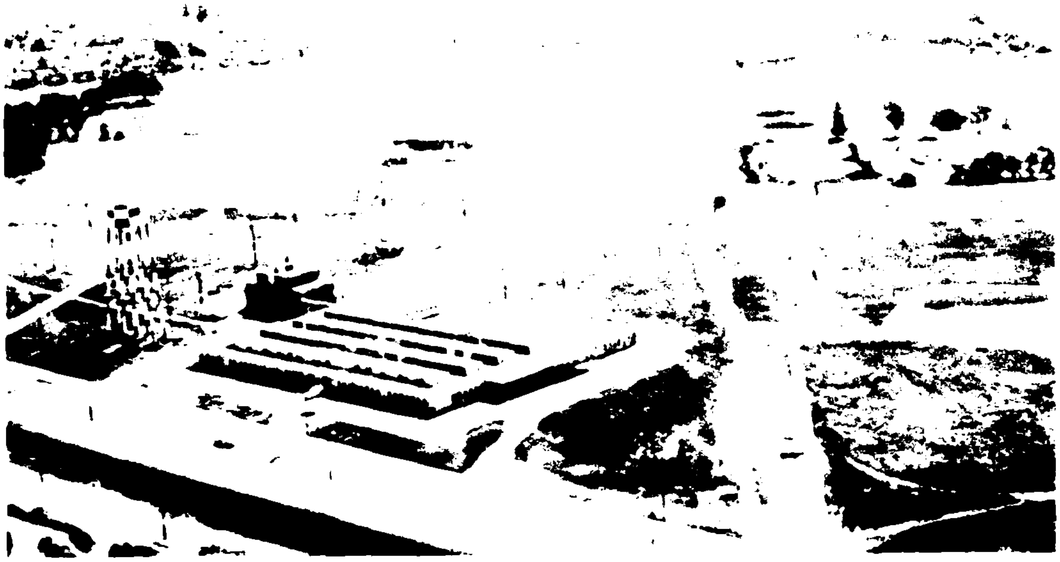


FIGURE A-1. Camp Kohler Annex with old base laundry operation building in foreground and the 1155th Technical Operations Squadron laboratory in the background.

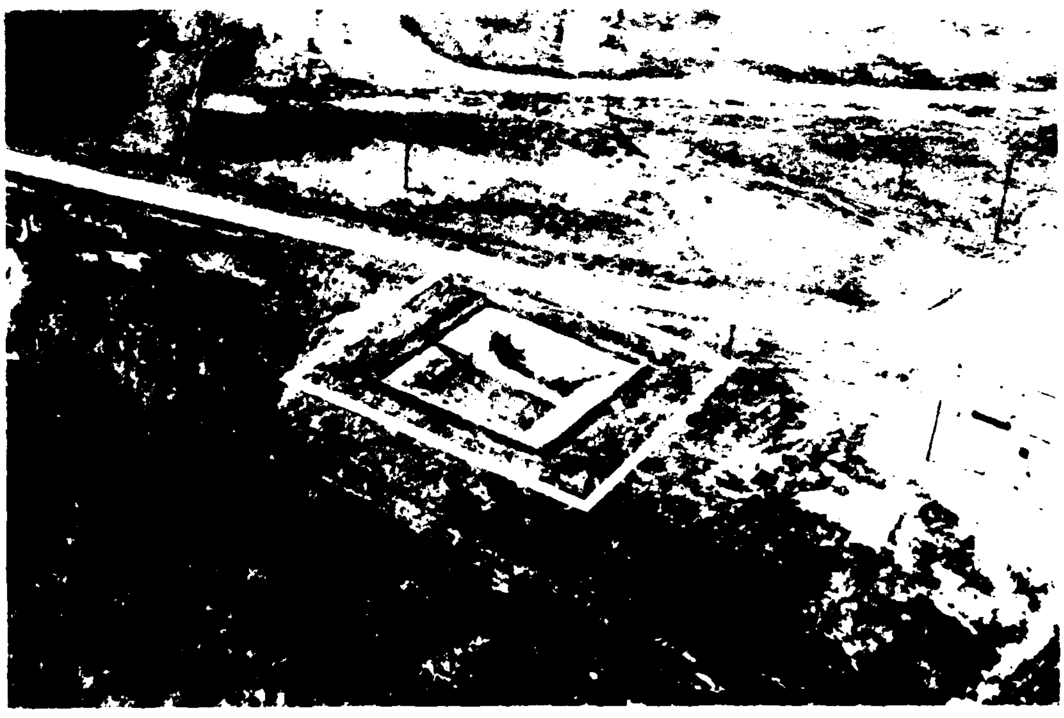


FIGURE A-2. Camp Kohler Annex—old wastewater holding basin.

FIGURE A-3. Sacramento River Dock Annex.

FIGURE A-4. Davis Communications Annex.

FIGURE A-5. Davis Communications Annex wastewater percolation evaporation ponds.

FIGURE A-6. McClellan Storage Annex Facilities adjacent to the Aerojet industrial complex.

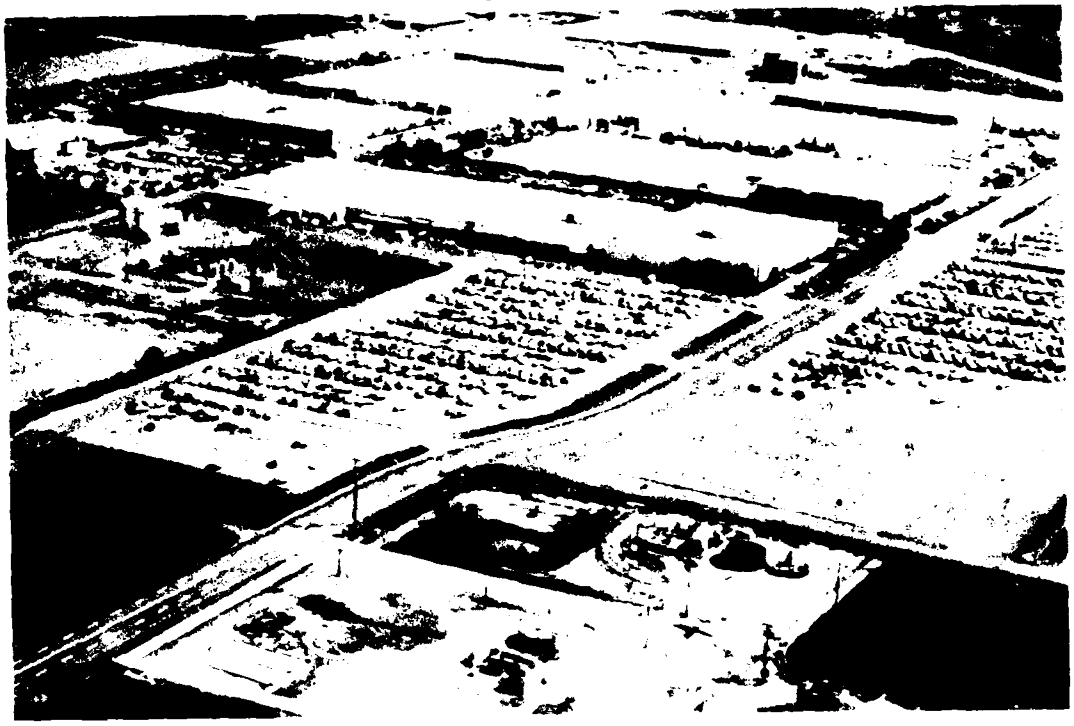


FIGURE A-7. McClellan Storage Annex—wastewater treatment plant.

FIGURE A-8. Capehart Family Housing Annex.

FIGURE A-9. Lincoln Communications Annex—wastewater oxidation pond.

FIGURE A-10. McClellan AFB—recently purchased area where PCB contamination was found.

FIGURE A-11. McClellan AFB recently purchased PCB contaminated area.

FIGURE A-12. McClellan AFB—sanitary wastewater treatment plant showing drying beds where industrial sludge was dewatered in the past.

FIGURE A-13. McClellan AFB—new plating shop area (Building 243G) with wastewater pretreatment facility in the foreground.

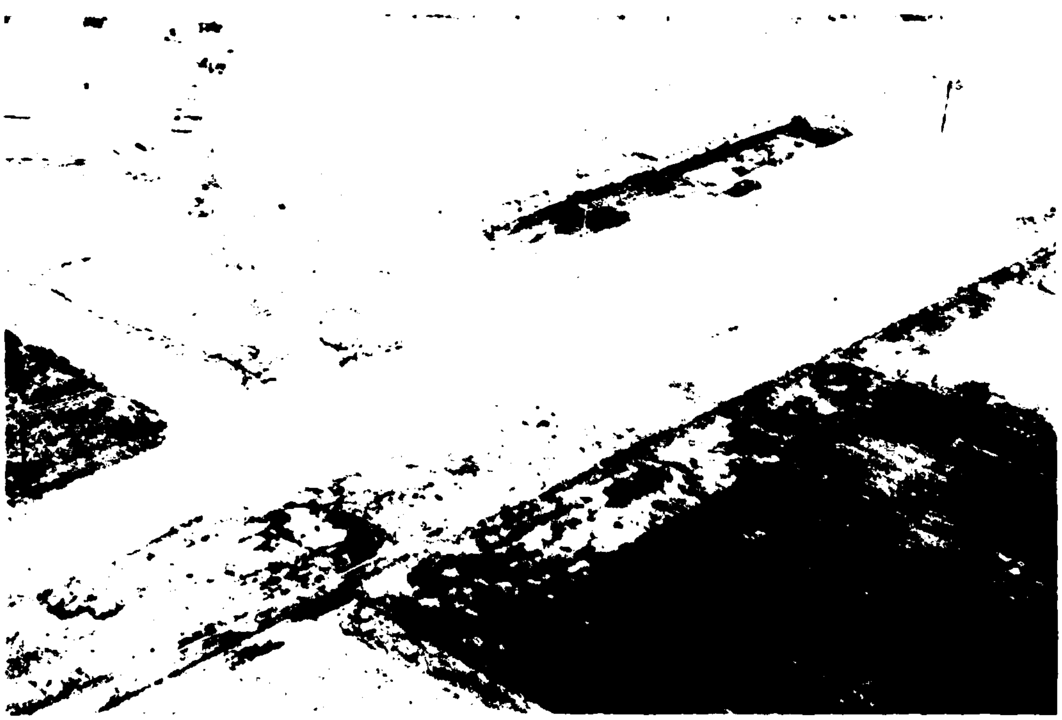


FIGURE A-14. McClellan AFB—sludge/oil pit (Site No. 4), no longer in use.

FIGURE A-15. McClellan AFB—past sludge pit areas (Sites 1, 2, 4, 5, 6, and 26).

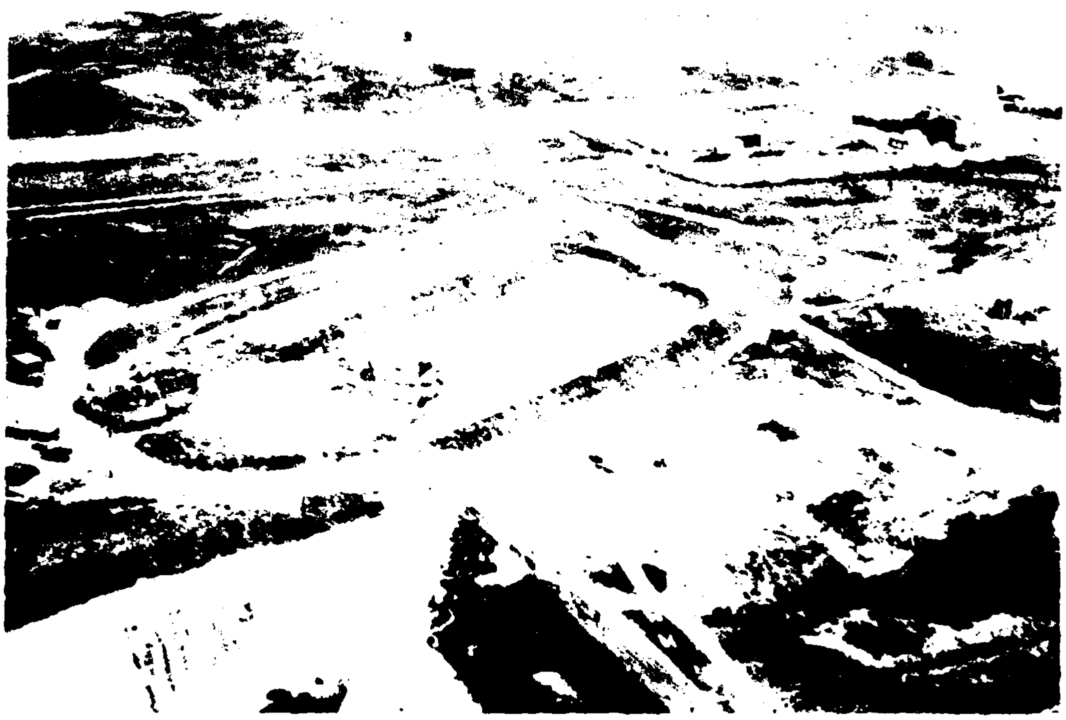


FIGURE A-16. McClellan AFB—existing landfill site in center (Site No. 8).

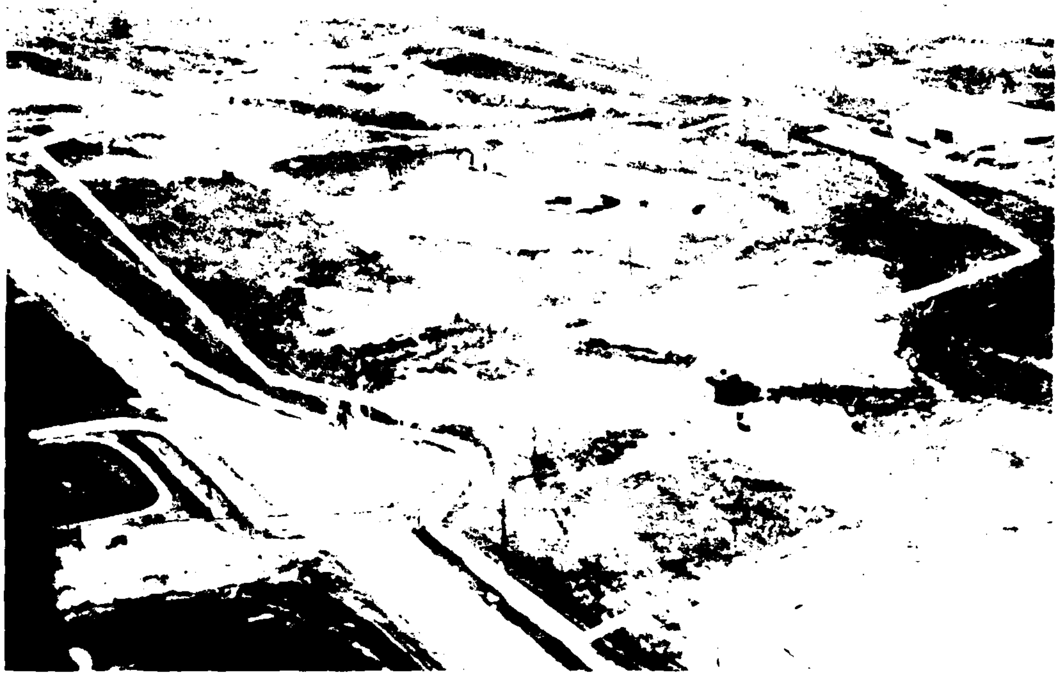


FIGURE A-17. McClellan AFB–past sludge pit and burial pit area (Site 8–still in use, and Sites 7, 9, 10, 11, 12, 13, 14, 15, and 16).

FIGURE A-18. McClellan AFB–past sludge pit and burial pit areas (Sites 17, 18, 19, 20, and 21).

FIGURE A-19. McClellan AFB—past burn pit area (Site 22) in background and old radioactive drum storage area in foreground.

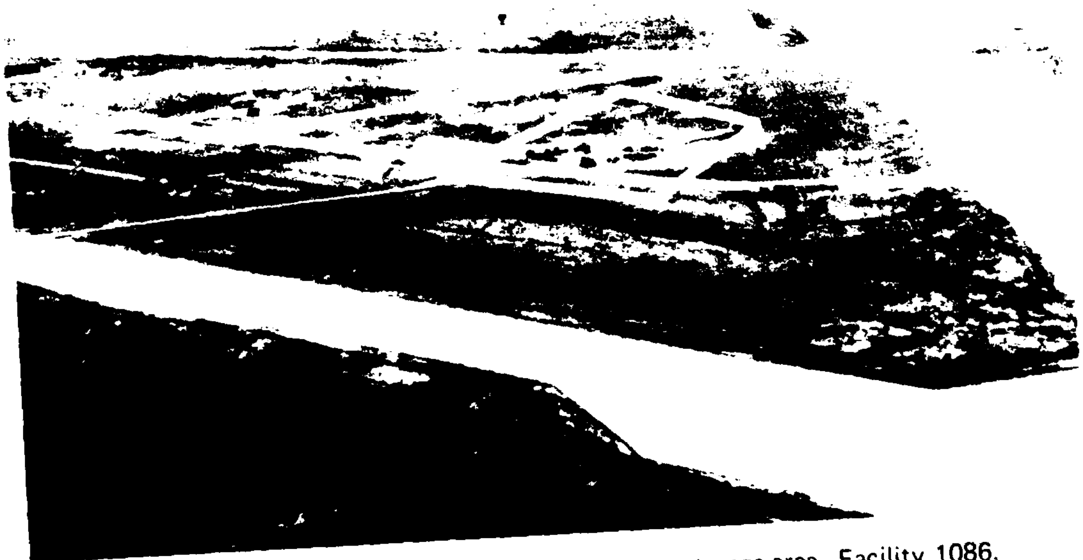


FIGURE A-20. McClellan AFB—hazardous waste storage area—Facility 1086.

FIGURE A-21. McClellan AFB - overview of past burial pit sludge pit areas (Site 8 - still in use, and Sites 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22).

Appendix B

OUTSIDE AGENCY CONTACT LIST

Appendix B
OUTSIDE AGENCY CONTACT LIST

1. California Water Quality Control Board, Central Valley Region, Sacramento, California.

   Point of Contact: Mr. Stan Phillips and Mr. Tom Pinkos, Telephone 916/445-0270

2. California Department of Health Services, Berkeley, California.

   Point of Contact: Mr. Williams, Telephone 415/540-2043

3. California Department of Health Services, Hazardous Materials Management Group, Sacramento, California.

   Point of Contact: Mr. Bob McCormick, Telephone 916/323-6043

4. California Department of Health Services, Sanitary Engineering Group, Sacramento, California.

   Point of Contact: Mr. Jess Moorehouse, Telephone 916/445-1736

5. Arcade Water District, Sacramento, California.

   Point of Contact: Mr. Walt Libal, Telephone 916/483-2953

6. U.S. Environmental Protection Agency--Region IX, San Francisco, California.

   Point of Contact: Mr. Jerry Klug, Telephone 415/556-7858

7. Department of Fish and Game, Sacramento, California.

   Point of Contact: Mr. R. D. Mallette, Telephone 916/445-3535

8. Sacramento County Planning Department, Sacramento, California.

   Point of Contact: Mr. Al Frietas, Telephone 916/440-7914

Appendix C

RESUMES OF CH2M HILL PARTICIPANTS IN THE McCLELLAN AFB RECORDS SEARCH

NORMAN N. HATCH, JR.
Water and Wastewater Engineer

Education

M.S., Environmental Engineering, University of Florida, 1973
M.S., Analytical Chemistry, University of Florida, 1972
B.S., Chemistry, University of New Hampshire, 1969

Experience

Mr. Hatch joined the firm in July of 1973 and has been involved in the following projects.

- Project manager on feasibility study for treatment of industrial wastewater generated from the Air Products and Chemicals, Inc., manufacturing facility in Pensacola, Florida.

- Project manager on several treatability studies and process selection for industrial clients, including American Cyanamid, Arizona Chemical Company, and Kaiser Agricultural Chemicals. Other industrial experience includes: Hercules Pine Products, Corchem, Inc., Corning Glass, Inc., William Carter Company, and Hess Oil Virgin Islands Corporation.

- Lead engineer on ozone disinfection feasibility study for the City of Philadelphia's Queen Lane Water Treatment Plant.

- Process design and design of chemical feed and sludge handling facilities for the Alexander City, Alabama, Water Treatment Plant.

- Feasibility study of direct wastewater reuse for potable water for the City of St. Petersburg, Florida.

- Cost-effective analysis and process selection for treatment of combined domestic and paper mill wastewater for the City of Harriman, Tennessee.

- Preparation of various segments of 201 facilities plans for Monroe County (Florida Keys); Lake City, Florida; Alachua County, Florida; Puerto Rico; and Live Oak, Florida.

- Preparation of operation and maintenance manuals for wastewater treatment facilities in Boca Raton, St. Augustine, and Winter Park Estates, Florida, and Air Products and Chemicals, Inc., Pensacola, Florida.

NORMAN N. HATCH, JR.

- Project manager for the planning, supervision, and performance of pilot plant investigations for the removal of hydrogen sulfide from potable water for the Orlando Utilities Commission, Orlando, Florida.

- Team leader for nationwide survey of water treatment plant sludges aimed at the development of National Pollutant Discharge Elimination System discharge limits for the potable water industry.

- Development of lead storm-water model for EPA Needs Survey.

Before joining CH2M HILL, Mr. Hatch was employed as a chemist with the E.I. du Pont de Nemours Photo Products Plant in Parlin, New Jersey.

Membership in Organizations

Phi Beta Kappa
Phi Kappa Phi
Society of the Sigma Xi
Water Pollution Control Federation

■ STEVEN R. HOFFMAN

Education

B.S., Civil Engineering, South Dakota School of Mines and Technology, 1971

Experience

Mr. Hoffman is a civil and sanitary engineer who is currently serving as a project manager and project technical consultant on a variety of solid and hazardous waste management projects for CH2M HILL. Examples of his project experience are:

- Project technical consultant on various aspects of municipal, industrial, and hazardous solid waste collection and disposal. Projects include collection system analysis; waste characterization and reduction; municipal solid waste landfill site selection, design, and gas recovery; and landfill disposal of hazardous and industrial sludges throughout the U.S.A.

- Project manager for a hazardous waste disposal study for an ARCO oil refinery in Washington, including waste extraction analysis, groundwater and unsaturate zone monitoring, and waste migration analysis.

- Project manager for assistance with compliance to RCRA regulations for a Gulf Oil refinery in Texas, including waste characterization, preparation of interim status plans, implementation of monitoring programs, and assistance in permit preparation.

- Assistant project manager for hazardous materials disposal site record searches for two U.S. Air Force bases to assess potential for waste migration from present and past practices and to recommend followup actions.

- Assistant project manager responsible for sanitary landfill design and preparation of operations plan and contract bid documents for a municipal solid waste landfill in Portland, Oregon.

- Project manager in developing a disposal system for and analyzing the impacts of a new land disposal technique for an industrial/hazardous sludge containing a high concentration of heavy metals, for the Monsanto Corporation, Seattle, Washington.

- Project manager for ITT Rayonier pulp and paper mill sludge disposal landfills in Grays Harbor and Clallam Counties, Washington, including site feasibility studies, final designs, and operational plans.

STEVEN R. HOFFMAN

- Assistant project manager for a resource recovery feasibility study and solid waste management plan for Snohomish County, Washington. The project includes alternative technology analysis, economic feasibility analysis, marketing studies, and management strategies.

- Project engineer for the Solid Waste Management Study for King County, Washington. Mr. Hoffman's responsibilities included assessing the environmental impacts of solid waste handling facilities and performing conceptual designs and costing for transfer stations, shredding and baling facilities, ocean disposal, resource recovery process systems, rail haul facilities, energy recovery systems, and sanitary landfills.

- Project manager for developing a solid waste management plan for Trinity County, California, with major emphasis on transfer, transport, sanitary landfill, and management options.

- Project manager and project engineer on a variety of water resources projects including flood studies, urban drainage and water quality studies, and environmental impact studies.

- Project engineer for developing a preliminary design for a solid waste transfer and refuse-derived fuel processing facility for the Metropolitan Service District, Portland, Oregon.

- Project engineer for preliminary and final design of a shredfill processing facility for Cowlitz County, Washington, which consisted of shredding, magnetic separation, leachate collection, treatment, and disposal.

- Project engineer for a pyrolysis and energy recovery feasibility study and a phased sanitary landfill design for Grays Harbor County, Washington. The design included a rural collection/transfer system to transport wastes to the landfill site.

Prior to joining CH2M HILL, Mr. Hoffman was a pollution control engineer with the Environmental Protection Agency where he conducted site investigations and wrote pollution control standards for South Dakota.

Professional Registration

Washington

Membership in Organizations

American Society of Civil Engineers

GARY E. EICHLER
Hydrogeologist

Education

M.S., Engineering Geology, University of Florida, 1974
B.S., Construction and Geology, Utica College of Syracuse University, 1972

Experience

Mr. Eichler has been responsible for ground-water projects for both water supply and effluent disposal. Studies have included site selection, well design, construction services, monitoring and testing programs, determination of aquifer characteristics, and well field design. Examples of projects on which Mr. Eichler has worked include:

- Palm Coast, Florida. Conducted a test well program to determine available ground-water resources of a 250,000-person coastal development.

- Live Oak, Florida. Determination of geologic conditions at a pond failure site; identification of failure causes and recommendation for redesign of the facility compatible with site geology.

- Quaker Oats Company, Belle Glade, Florida. Test pumping and water quality sampling for an injection well facility; provided operational design criteria for the disposal system and determined aquifer characteristics.

- St. Augustine, Florida. Prepared a program of exploration and testing to locate a future supply of water; determined hydrogeologic conditions, located potential well sites, and initiated a test program.

Prior to joining CH2M HILL in 1976, Mr. Eichler was an engineering geologist with Environmental Science and Engineering, Inc., of Gainesville, Florida. Responsibilities there included project management, soils investigations, siting studies, ground-water and surface-water reports, and federal and state environmental impact studies. He has professional capabilities in the following areas.

- Hydrogeology. Water supply well location, aquifer testing, well field layout, injection well testing and monitoring program design, and well construction inspection.

- Water resources inventory. Potentiometric mapping, water yield, and availability determinations.

GARY E. EICHLER

- Site investigations. Determination of subsurface conditions, primarily in soil media. Determination of stratigraphic correlation and associated physical properties for engineering design.

- Environmental permitting. Federal, state, regional, and local permit studies associated with industrial and mining projects.

- Clay mineralogy. Clay mineral reactions primarily associated with lime stabilization for highways and other engineering projects. Participated in a Brazilian highway project and developed laboratory analysis for lime-soil reactions.

- Engineering geology. Geologic exploration, soil property determinations for engineering design, and water and earth materials interactions associated with construction.

- Geophysics. Well logging and interpretation.

Mr. Eichler directed the laboratory analysis of tropical soils to determine engineering properties and reaction potential with lime additives for a Brazilian highway project. He also assisted in the preparation and presentation of a seminar on lime stabilization sponsored by the National Lime Association.

Membership in Organizations

American Water Resources Association
Association of Engineering Geologists
Geological Society of America
Southeastern Geological Society

Publications

Engineering Properties and Lime Stabilization of Tropically Weathered Soils. M.S. thesis, Department of Geology, University of Florida. August 1974.

■ **BRIAN H. WINCHESTER**
Ecologist

Education

B.S., Wildlife Ecology, University of Florida, 1973

Experience

Mr. Winchester's responsibilities at CH2M HILL include project management, design and implementation of field sampling programs, data analysis and interpretation, impact assessment and prediction, environmental planning for impact mitigation, report preparation and review, and technical consulting at client-agency hearings. He has applied his expertise to numerous Environmental Impact Statements (EIS's), Developments of Regional Impact (DRI), and industry, power plant, and 208 studies.

- Trident Submarine Base EIS—Managed terrestrial and wetland biology subproject. Designed and directed quarterly field sampling and analyses for coastal sites in Rhode Island, Virginia, South Carolina, Georgia, and Florida. Prepared terrestrial and wetland portions of draft and final EIS.

- Gulf Intracoastal Waterway EIS—Conducted flora/fauna assessment of biota along the 300-mile Intracoastal Waterway in coastal Louisiana. Assessed impacts of maintenance dredging.

- California Lake Watershed EIS—Inventoried and mapped biotic communities for a 9-square-mile watershed in Dixie County, Florida. Assessed impacts of flood control channelization of major watercourses.

- Phosphate Industry DRI's—Managed or assisted in preparing five phosphate mine DRI's in central Florida. Helped develop mining and reclamation plans and provided technical input at client/agency hearings. Also provided biological baseline and impact assessment data for beneficiation plant sitings.

- Residential Development DRI's—Conducted biotic community inventories delineated wetlands, and prepared DRI's for three proposed residential developments in central and southern Florida.

- Wetlands Studies—Developed cost-effective, time-effective methodology for estimating the ecological value of freshwater wetlands and applied the technique to over 800 wetlands in central peninsular Florida. Assessed potential dredge and fill impacts on numerous wetlands.

- Transportation/Corridor Studies—Evaluated biological impacts associated with alternative routings of major new highways in Pinellas and Duval Counties, Florida. Assessed environmental impacts of upgrading a telephone communications corridor extending from Windermere to Tampa. Described biota and prepared a negative declaration for a proposed interstate highway interchange in Flagler County.

BRIAN H. WINCHESTER

- Power Plant Studies—Conducted study of aquatic biota entrained at a Miami generating station. Assessed impacts of blowdown on plant communities surrounding two Florida generating stations. Assisted in delineation of biotic communities for a generating station expansion in Crystal River, Florida. Prepared environmental assessments for siting power plants in western and northeastern Washington.

- Industry Studies—Managed a 2-year biological monitoring program to assess potential impacts of industrial effluents in upper Escambia Bay. Conducted baseline terrestrial and aquatic quarterly sampling for a clean fuels facility to be located adjacent to an estuarine area in Jacksonville, Florida. Predicted SO_2 and NO_x air emission impacts on vegetation for a proposed caprolactam facility in southern Alabama. Contributed to preliminary biological inventories of limestone quarry and processing plantsites in central and coastal Alabama.

- 208 Studies—Mapped and assigned value classifications for all nonmarine wetlands in Pasco, Pinellas, Hillsborough, and Manatee Counties, Florida, for Tampa area 208.

- Rare and Endangered Biota Research—Managed and designed a research project on the ecology and management of a recently rediscovered endangered mammal. Conducted numerous endangered biota inventories.

Membership in Organizations

Ecological Society of America

Publications

"An Approach to Valuation of Florida Freshwater Wetlands." *Proceedings of the Sixth Annual Conference on the Restoration and Creation of Wetlands*, 1979 (with L. D. Harris).

The Current Status of the Colonial Pocket Gopher. *Oriole* 43:33-35. 1978 (with R. S. DeLotelle).

Ecology and Management of the Colonial Pocket Gopher: A Progress Report. *Proceedings of the Rare and Endangered Wildlife Symposium*, Athens, Georgia, 1978 (with R. S. DeLotelle, J. R. Newman, and J. T. McClave).

The Ecological Effects of Arsenic Emitted from Nonferrous Smelters. Final Report for U.S. EPA, Washington, D.C. (with Francis E. Benenati and Timothy P. King) February 1976.

JERRY L. AYCOCK
Civil (Environmental) Engineer

Education

M.S. currently in program, Environmental Engineering, Auburn University
B.S., Civil Engineering, Auburn University, 1978

Experience

As a project engineer in the Industrial Processes Department, Mr. Aycock's project involvement since joining CH2M HILL has included:

- Laboratory, bench- and pilot-scale treatability studies for evaluation of physical/chemical treatment processes.
- Conceptual designs for industrial projects.
- Solid/hazardous waste source characterization and quantification.
- Development of RCRA Phase I implementation plans for petroleum refinery and other industries.

Mr. Aycock's previous experience includes traffic engineering data/ graphics compilation, technical laboratory soils testing, and pile driving and foundation inspection for industrial construction projects.

Professional Engineer Registration

Engineer-In-Training, Alabama

Membership in Organizations

Alabama Society of Professional Engineers
Water Pollution Control Federation
Alabama Water Pollution Control Association
American Society of Civil Engineers

Appendix D

HISTORY OF McCLELLAN AIR FORCE BASE

Appendix D
HISTORY OF McCLELLAN AFB

1. History

McClellan AFB was established in 1936, when Congress authorized $7 million for the construction of a new Air Repair Depot and Supply Base for the War Department. The base was dedicated in 1939, and was initially named the Sacramento Air Depot; it was later renamed McClellan Field in honor of Major Hezekiah McClellan, a pioneer in the charting of Alaskan air routes, who was killed while flight testing an aircraft near Centerville, Ohio. Rockwell Air Depot, located on an island in San Diego Bay, had outgrown its facilities and was selected for transfer to the Sacramento site.

Base operations increased dramatically during World War II from an operation of a few thousand people to an industrial facility employing more than 18,000 civilians, which processed some 7,000 aircraft for action during the war years. McClellan AFB changed from a bomber depot following World War II to a jet fighter maintenance depot in the early 1950's. The Sacramento Air Logistics Center (ALC), formerly known as the Sacramento Air Material Area, expanded its responsibility for aircraft support and began providing worldwide logistics for more types of aircraft and supporting equipment. In the early 1960's, the Sacramento ALC emerged as the Air Force specialist organization for space systems logistics support and expanded its responsibility for maintenance and support of ground communications and electronic equipment.

The Sacramento ALC gained mission support responsibility in 1965 for the Ballistic Missile Early Warning System, Semi-Automatic Ground Environment, and interceptor backup for the system. During this time, aircraft design technology evolved from emphasis on production of single-purpose airplanes to combining many facets such as range, maneuverability, bomb payload, air-to-air, and air-to-ground missile capabilities. This resulted in the design of the F-111, the first aircraft built specifically to reverse the historic trend toward specialization. In 1962, the Sacramento ALC was assigned the management responsibility for all versions of the F-111 and FB-111. The F-111 program has represented one of the most important and continuous workloads over the past 18 years for the Sacramento ALC. Equally important management responsibilities at the center include radar networks used to detect and track enemy and allied aircraft, earth-orbiting objects, and land- or sea-launched ballistic missiles.

By the mid 1960's, the Sacramento ALC had become the Air Force Logistic Command's lead center in support of the Air Force's logistics requirements in the Southeast Asia and North Pacific areas. At the beginning of the 1970's, the Sacramento ALC was playing an active role in the redistribution of Department of Defense assets as the conflict in Southeast Asia came to an end. One of the ALC's most recent aircraft system management assignments was the A-10 aircraft, which was developed as the Air Force's primary close air support aircraft.

At the present time, the ALC continues to be a fighter maintenance and support facility and is also involved in logistics planning for the Space Shuttle Program. The latest phase of logistics evolution is a concept initiated in 1974 by the Air Force Logistics Command known as the Technology Repair Center (TRC). The TRC's basic objective is to consolidate the aerospace hardware repair capabilities in the five Air Logistics Centers. This has resulted in a major realignment of maintenance workloads among the five centers. The TRC consolidates the repair of aerospace hardware that requires similar skills, facilities, tools, and the latest in test equipment. Sacramento ALC is the TRC for hydraulics, flight control accessories, ground communications, and electronic components, and in this capacity continues to carry out its responsibilities to the United States Air Force and the nation in meeting the challenges of the future through the use of the latest logistics management techniques.

2. Mission

McClellan AFB is an Air Force Logistics Command Base, and the heart of the base is the Sacramento Air Logistics Center. The mission of the Sacramento ALC is as follows:

a. Sacramento ALC provides worldwide logistics support of assigned weapon systems, equipment, and commodity items.

b. Sacramento ALC performs an industrial-type mission in providing maintenance, supply, and contracting services essential to Air Force Logistics.

Logistics support management includes many varied functions such as:

a. Determining of support requirements.

b. Arranging transportation of material and personnel.

c. Maintaining and repairing USAF equipment.

d. Acquiring supplies and services.

e. Providing quality assurance for assigned weapons and support systems.

Sacramento ALC currently serves as System Manager for 14 aircraft, seven missile and space programs, 24 electronics systems, and a large number of communications-electronics programs. Sacramento ALC also has Item Management responsibility for ground radar units, airframe components for assigned aircraft, electronic and electrical components, ground communications components, and all airborne and ground generators.

Sacramento ALC is also responsible for the repair and modifications of F/FB-111, A-10, F-105, F-106, and CT-39 aircraft.

Other units responsible to the ALC commander include: (1) the 2852nd Air Base Group, which is responsible for all support and housekeeping functions at McClellan AFB, (2) the 2951st Combat Logistics Support Squadron, which provides mobile supply and maintenance support to USAF forces on a worldwide basis ,(3) Detachment 5, 3025th Management Engineering Squadron, which provides manpower authorization and management engineering support, and (4) the USAF Clinic, which provides McClellan AFB with medical services.

The major tenant units at McClellan AFB and their missions are as follows:

a. Air Force Systems Command

The 1155th Technical Operations Squadron is responsible for worldwide maintenance and logistics support of deployed scientific equipment, operation of an analytical laboratory, and operation of specialized airborne atmospheric research.

b. Air Training Command

The 510 FTD (Field Training Detachment), a detachment of the 3751st Field Training Squadron, is responsible for providing maintenance training for assigned aircraft and radar systems.

c. Tactical Air Command

Detachment 2, 2nd Aircraft Delivery Group is responsible for directing, coordinating, and supervising the flight deliveries of designated military aircraft.

The 431st Fighter Weapons Squadron is responsible for the operational testing and evaluation of new or modified systems and equipment for the F-111.

d. Air Force Communications Command

The 2049th Communications Group is responsible for Air Traffic Control services, navigational aids, and telecommunications and telephone services at McClellan AFB.

The 1849th Electronics Installation Squadron is responsible for electronics installation work, primarily in the northwestern United States.

e. Military Airlift Command

The 41st Rescue and Weather Reconnaissance Wing (41 RWRW) is responsible for rescue operations (including combat rescue and humanitarian airlift) and weather reconnaissance (including typhoon and hurricane reconnaissance) for numerous weather agencies. Included in the 41st RWRW are the 41st Aerospace Rescue and Recovery Squadron, the

55th Weather Reconnaissance Squadron, the 17th Weather Squadron, and the 41st Consolidated Aircraft Maintenance Squadron.

Other tenant units at McClellan AFB include the following:

a. The Fourth Air Force Reserve

b. The Coast Guard Air Station Sacramento

c. Detachment 1905, 17th District, Air Force Office of Special Investigations

d. Canadian Forces Liaison Detachment

e. Royal Air Force Liaison Office

f. Air Force Commissary Complex Service

g. American Red Cross Field Office

h. General Accounting Office

i. Defense Logistics Agency

Appendix E

BIOTA

Appendix E
BIOTA

1. Flora

Three installations included in the Records Search contain significant acreages of unimproved lands: McClellan AFB (416 acres), the Lincoln site (351 acres), and the Davis site (311 acres). The predominant plant community on all of these sites, and in most of the surrounding region, is the valley grassland. Riparian forests and vernal pools also occur within or in close proximity to these sites, though their acreage is very small.

Grasslands of the Sacramento Valley were originally dominated by perennial bunch grasses (Stipa pulchra being the most important) with a variety of annual species also being present. However, changes in these pristine grasslands began to accelerate by the mid- to late 1800's, attributed primarily to intense grazing, invasion of the grasslands by introduced plant species, cultivation, and fire [4]. By the early 1900's, the species composition of the valley grassland had been completely altered, the former dominants being replaced by various annual species, many of them introduced from Europe and western Asia. Although remnants of the former perennial grassland may still be found in some areas, no such sites are known to occur in Sacramento County.

Practically all of the unimproved lands of McClellan AFB and the Davis and Lincoln sites now support the annual grassland typical of the region. Actual species composition varies according to soil type, soil moisture, soil nutrients, disturbance (such as grazing), successional stage, and allelopathic interactions. Typical species include various wild oats (Avena barbata and A. fatua), soft chess (Bromus mullis) and other bromes (Bromus rigidus and B. rubens), star thistle (Centaurea solstitialis), filarees (Erodium spp.), mustards (Brassica geniculata and B. campestris), curly dock (Rumex crispus), and many other species. A complete list of plant species potentially occurring on unimproved lands in the vicinity of McClellan AFB is presented in Appendix F.

Although no riparian forests occur on McClellan AFB or its other installations in the region, they do occur on nearby adjoining lands. They also occur in close proximity to the USAF docking facility on the Sacramento River. Species typically occurring in such woodlands include willows (Salix lasiolepis, hindsiana, and laevigata), cottonwood (Populus fremontii), California black walnut (Juglans hindsii), oregon ash (Fraxinus latifolia), locust (Robinia pseudo-acacia), tree-of-heaven (Ailanthus altissima), elderberry (Sambucus mexicana), blackberry (Rubus vitifolius), white alder (Alnus rhombifolia), wild grape (Vitus californica), wild cucumber (Marsh fabaceus), red berry (Rhamnus crocea), and coffee berry (Rhamnus californica).

Although primarily unforested where it crosses McClellan AFB, Magpie Creek does constitute a much disturbed riparian habitat on USAF property. Cottonwood and arroyo willow (S. lasiolepis) are the only native tree species found along the creek, and they occur infrequently as young saplings. Due to the steep banks, there is little riparian vegetation except for sporadic patches of cattail (Typha latifolia) or common tule (Scirpus acutus). Further information on the flora of Magpie Creek can be obtained from a recent study by Koutnik [5].

Vernal pools (or hogwallows) are small, hardpan-floored depressions which are scattered throughout the valley grasslands. They generally fill with water in the winter and dry up during the spring, supporting a unique assemblage of annual plant species in the process. Vernal pools of varying size occur in the Sacramento region, though many have been eliminated due to the development of the area. Pool size ranges from 10 to 20 square feet (which are common) up to 150 acres [6]. Vernal pools also occur on McClellan AFB in the grasslands surrounding the runways, but many of them have been disturbed over the past decades. Typically dominant species of vernal pools, according to the U.S. Army Engineer Waterways Experiment Station [7] are: water starwort (Callitriche spp.), downingia (Downingia cuspidata), needle spikerush (Elocharis acicularis), blunt spikerush (Eleocharis obtusa), waterweed (Elodea spp.), button snakeroot (Eryngium aristulatum), quillwort (Isoetes howellii), water purslane (Ludwigia palustris), pillwort (Pilularia americana), popcorn flower (Plagiobotrys spp.), mesa mint (Pogogyne abramsii), aquatic buttercup (Ranunculus aquatilis), and speedwell (Veronica peregrina).

2. Fauna

A brief field survey of fauna present on McClellan AFB was conducted on April 30, 1981. During that time, one fish, one amphibian, one reptile, two mammal, and 24 bird species were sighted. These species are identified in Appendix G, together with a listing of other vertebrate species which are expected to occur in the vicinity of McClellan AFB.

Although numerous small rodents (deer mice probably being the most numerous) inhabit the grasslands on McClellan AFB, the blacktail hare is probably the largest mammal permanently residing on-base. Muskrats were observed at a number of locations on Magpie Creek. In regard to birds, game species such as pheasant, mourning dove, and California quail are common on the site, though they are not hunted. Mallards were observed in Magpie Creek and (together with pintails) in the flooded grasslands of the Davis site. A female cinnamon teal with young was observed in the larger wastewater holding pond northwest of Building 704. According to a 1976 field evaluation performed by the California Department of Fish and Game, McClellan AFB is regarded as having no significant potential for wildlife management. The Davis and Lincoln sites both have the potential of being enhanced for use by dove, pheasant, and waterfowl. Most of the Davis site is presently leased for sheep grazing.

Nesting of barn swallows and pigeons on the upper tracks of hangar doors has been a problem at some of the buildings on McClellan AFB. Nests were also observed under bridges. Various approaches have been used to reduce the nesting in such areas (e.g., removal of adults, removal of vacant nests during non-breeding periods, screening access-ways), but none have had satisfactory success.

The vertebrate fauna of Magpie Creek is limited primarily to mosquitofish, waterfowl, muskrats, and amphibians, though some of the other fish species listed in Appendix G may also be present. A study in 1973 [8] documented the macroinvertebrate fauna of the creek, with both densities and diversity being limited in the concrete-channelized portions of the creek where little natural substrate was available. Sludge worms (Tubifex) were the only species found upstream of McClellan AFB, where the San Six Wastewater Treatment Plant provides most of the flow. Proceeding downstream, damselfly (Ischnura), Psychoda fly, and mosquito larvae become more prevalent.

3. Endangered Species

Endangered plant and wildlife species which are found within 50 miles of McClellan AFB are shown in Table E-1. Of the 14 plant species listed, eight species occur within 25 miles of the base, but only two species are known to occur within Sacramento County. These are Sacramento orcutt grass (Orcuttia viscida), which occurs in the vicinity of

Table E-1
ENDANGERED SPECIES OCCURRING WITHIN 50 MILES OF McCLELLAN AFB
(From Mallette, 1980)

Common Name	Scientific Name	Classification
Animals		
Salt-marsh harvest mouse	*Reithrodontomys rivarentris*	SE, FE
Bald eagle[1]	*Haliaeetus leucocephalus leucocephalus*	SE, FE
American peregrine falcon[1]	*Falco peregrinus anatum*	SE, FE
California clapper rail	*Rallus longirostris obsoletus*	SE, FE
Thicktail chub	*Gila crassicauda*	SE (probably extinct)
California black rail	*Laterallus jamaicensis coturniculus*	SR
California yellow-billed cuckoo	*Cossyzus americanus occidentalis*	SR
Giant garter snake[1]	*Thamnophis couchi gigas*	SR
Lange's metalmark	*Apodemis mormo langei*	FE
Plants		
Mudflat quill-plant	*Lilaeopsis masonii*	SR
Soft-haired bird's beak	*Cordylanthus mollis* ssp. *mollis*	SR
Contra costa wallflower	*Erysimum capitatum* var. *angustatum*	SE, FE
Antioch dunes evening primrose	*Oenothera deltoides* var. *howellii*	SE, FE
Irish hill buckwheat	*Eriogonum apricum* var. *prostratum*[1]	SR
Iron buckwheat	*Eriogonum apricum* var. *apricum*[1]	SE
Colusa grass	*Neostrapfia colusana*	SE
Crampton's orcuttgrass	*Orcuttia mucronata*	SE, FE
El Dorado morning glory	*Calystegia stebbinsii*[1]	SR
Pine hill flannel bush	*Fremontodendrom decumbens*[1]	SR
El Dorado bedstraw	*Galium californicum* spp. *sierrae*[1]	SR
Layne's ragwort	*Senecio layneae*[1]	SR
Sacramento orcuttgrass	*Orcuttia viscida*[1]	SE
Boggs Lake hedge hyssop	*Gratiola heterosepala*[1]	SE

Classification Codes: SE - Endangered, State List
SR - Rare, State List
FE - Endangered, Federal List

[1]Expected to occur within 25 miles of McClellan Air Force Base.

Phoenix Field, and Boggs Lake hedge hyssop (Gratiola heterosepala), which is found in the vicinity of Rio Linda [9].

Only three listed wildlife species are expected to occur within 25 miles of McClellan AFB: the bald eagle, peregrine falcon, and giant garter snake [10]. According to Craig and Gustafson [11], the nearest eagle nest sites are near Lake Pillsbury (Mendocino County) and in the vicinity of Chico (Butte County). However, juveniles or non-breeding eagles occasionally pass through the Sacramento area. Peregrine falcons regularly migrate through Sacramento County, and it is possible some may reside there [11]. The giant garter snake is confined to sloughs, marshes, and other permanent freshwater areas, and its nearest known location is in the major riverine systems and associated wetlands south of Sacramento.

4. Environmental Stress

Most of the unimproved grassland areas on McClellan AFB have been disturbed at one time or another; much of Magpie Creek has been cleared of former riparian vegetation and channelized, and some of the vernal pool areas have been variously ditched or filled in. However, many of these actions took place in the past, and the existing vegetation growing on the unimproved areas of McClellan is generally healthy, vigorous, and supporting the appropriate fauna.

Magpie Creek has been especially impacted due both to its physical modification and the effluent from the "San Six" County Wastewater Treatment Plant located above McClellan. In 1977, a fish kill of 100 to 150 minnows took place in Magpie Creek and was ultimately traced to high chlorine residuals originating from the county treatment plant (this problem has since been corrected).

In regard to hazardous wastes, the use of persistent and later non-persistent pesticides for mosquito control onbase has undoubtedly affected the natural invertebrate fauna of Magpie Creek and the vernal pools. This impact is considered to be minor. There is no evident stress on biota due to the use and disposal of hazardous wastes at McClellan AFB.

Appendix F

POTENTIAL PLANT SPECIES ON UNIMPROVED LANDS, McCLELLAN AFB

Appendix F

POTENTIAL PLANT SPECIES ON UNIMPROVED LANDS, McCLELLAN AFB

(From SALC, 1981) [12]

Family	Common Name	Scientific Name
Aceraceae	Maple family	
	Box elder	Acer negundo
Alismataceae	Water plantain family	
	Water plantain	Alisma plantago
	Echinodorus	Echinodorus cordifolius
	----	Machaerocarpus californicum
	Arrowhead	Sagittaria latifolia
	Arrowhead	Sagittaria longiloba
	Arrowhead	Sagittaria montevidensis calycina
Amaranthaceae	Amaranth family	
	Tumbling pigweed	Amaranthus graecizans
	Rough pigweed	Amaranthus retroflexus
Amaryllidaceae	Brodiaea	Brodiaea spp.
Anacardiaceae	Sumac family	
	Poison oak	Toxicodendron diversiloba
Apiaceae	Carrot family	
	Water hemlock	Cicuta douglasii
	Poison hemlock	Conium maculatum
	Rattlesnake weed	Daucus pusillus
	Sweet fennel	Foeniculum vulgare
	Purple sanicle	Sanicula bipinnatifida
	Shepherd's needle	Scandix pecten-veneris

Family	Common Name	Scientific Name
Apocynaceae	Dogbane family	
	Periwinkle	Vinca major
Asteraceae	Sunflower family	
	Blow-wives	Achyrachaena mollis
	Western ragweed	Ambrosia psilostachya
	California mugwort	Artemesia douglasiana
	Dog fennel	Anthemis cotula
	Purple aster	Aster chilensis var. medius
	Slender aster	Aster exilis
	Beggar's tick	Bidens frondosa
	Bur marigold	Bidens laevis
	Brickle bush	Brickellia california
	Tocalote	Centaurea melitensis
	Yellow star-thistle	Centaurea solstitialis
	Common spikeweed	Centromadia pungens
	Bull thistle	Cirsium vulgare
	Chicory	Cichorium intybus
	Horseweed	Conyza canadensis
	Cudweed	Gnaphalium chilense
	Gum plant	Grindelia camporum
	Common sunflower	Helianthus annuus
	Fitch's spikeweed	Hemizonia fitchii
	Telegraph plant	Heterotheca grandiflora
	Tarweed	Holocarpha virgata
	Smooth cat's ear	Hypochoeris glabra
	Prickly lettuce	Lactuca serriola
	Tidy-tips	Layia fremontii
	Goldfields	Baeria chrysostoma
	Pineapple weed	Matricaria matricarioides
	Mike	Micropus californicus
	Bristley oxtongue	Picris echioides
	Shrubby bitterweed	Senecio douglasii
	Common groundsel	Senecio vulgaris
	Milk thistle	Silybum marianum

Family	Common Name	Scientific Name
Asteraceae	Sow thistle	*Sonchus asper*
(Continued)	Dandelion	*Taraxacum officinale*
	Salsify	*Tragopogon porrifolius*
	Cockle bur	*Xanthium strumarium*
Boraginaceae	Borage family	
	Fiddleneck	*Amsinckia douglasiana*
	Popcorn flower	*Plagiobothrys nothofulvus*
Brassicaceae	Mustard family	
	Common yellow mustard	*Brassica campestris*
	Shepherd's purse	*Capsella bursa-pastoris*
	Pepper grass	*Lepidium nitidum*
	Wild radish	*Raphanus sativaus*
	Hedge mustard	*Sisymbrium officinale*
	Fringe pod	*Thysanocarpus curvipes*
Caprifoliaceae	Honeysuckle family	
	Blue elderberry	*Sambucus caerulea*
Caryophyllaceae	Pink family	
	Windmill pink	*Silene gallica*
Ceratophyllaceae		
	Hornwort	*Ceratophyllum demersum*
Chenopodiaceae		
	Lambsquarter	*Chenopodiuim album*
	Russian thistle	*Salsola kali*
Convolvulaceae	Morning glory family	
	Bindweed	*Convolvulus arvensis*

Family	Common Name	Scientific Name
Cyperaceae		
	Slough grass (sedges)	Carex spp.
	Tall umbrella sedge	Cyperus eragrostis
	Spike rush	Eleocharis acicularis
	Common tule	Scirpus acutus
	California bulrush	Scirpus californicus
	Alkali bulrush	Scirpus robustus
	Bulrush	Scirpus flovialis
	Bulrush	Scirpus micronatus
Dipsacaceae		
	Wild teasel	Dipsacus sylvestris
Equisetaceae		
	Horsetail	Equisetum hyemale
Euphorbiaceae	Spurge family	
	Turkey mullein	Eremocarpus setigerus
	Petty spurge	Euphorbia peplus
	Spotted spurge	E. supina
Fabaceae	Pea family	
	Wild licorice	Glycyrrhiza lepidota
	Sweet pea	Lathyrus sp.
	Lotus	Lotus uliginosus
	Spanish lotus	L. purshianus
	Deer weed	L. scoparius
	Dwarf lupine	Lupinus bicolor
	White lupine	L. densiflorus
	Bluebonnet	L. succulentus
	Bur clover	Medicago hispida
	White sweet clover	Melilotus albus
	Yellow sweet clover	Melilotus indicus
	Leather root	Psoralea macrostachya
	Black locust	Robinia pseudo-acacia

Family	Common Name	Scientific Name
Fabaceae	Tomcat clover	Trifolium tridentatus
(Continued)	Winter vetch	Vicia villosa
	Spring vetch	V. sativa
Fagaceae	Black oak	Quercus kelloggii
	Valley oak	Q. lobata
	Interior live oak	Q. wislizenii
Geraniaceae	Geranium family	
	Broad-leaf filaree	Erodium botrys
	Red-stem filaree	E. circutarium
	White-stem filaree	E. moschatum
	Cranesbill	Geranium dissectum
Hydrocharitaceae	Elodea	Elodea spp.
Juncaceae		
	Baltic rush	Juncus balticus
	Soft rush	Juncus effusus
Lamiaceae	Mint family	
	Water horehound	Lycopus americanus
	Henbit	Lamium amplexicaule
	Common horehound	Marrubium vulgare
	Coyote mint	Monardella villosa
	Vinegar weed	Trichostema lanceolatum
Lemnaceae		
	Duckweed	Lemna minor
Lythraceae		
	Loosetrife	Lythrum hussopifolia

Family	Common Name	Scientific Name
Malvaceae	Mallow family	
	Cheese weed	Malva parviflora
	Bull mallow	M. nicaeensis
	Alkalai mallow	Sida nederacea
Marsileaceae		
	Clover fern	Marsilea mucronata
Martyniaceae		
	Unicorn plant	Proboscidea louisianica
Najadaceae		
	Common water nymph	Najas guadalupensis
Oleaceae		
	Oregon ash	Fraxinus latifolia
Onagraceae	Evening primrose family	
	Farewell-to-spring	Clarkia purpurea
	Clarkia	Clarkia unguiculata
	Willow herb	Epilobium paniculatum
	Yellow water weed	Jussiaea californica
	Water primrose	Ludwigia peploides
	Evening primrose	Oenothera venusta
Papaveraceae	Poppy family	
	California poppy	Eschscholzia californica
	Frying pans	Eschscholzia lobbii
	Cream cup	Platystemon californicus
Plantaginacea	Plantain family	
	Buckhorn plantain	P. lanceolata
	Common plantain	Plantago major

Family	Common Name	Scientific Name
Plantanaceae	Sycamore	
	Western sycamore	Plantanus racemosa
Poaceae		
	Silver hair grass	Aira spp.
	Slender wild oats	Avena barbata
	Wild oats	Avena fatua
	Giant reed	Arundo donax
	Rattlesnake grass	Briza minor
	Rattlesnake chess	Bromus brizaeformis
	Soft chess	Bromus mollis
	Ripgut grass	Bromus rigidis
	Red brome	Bromus rubens
	Bermuda grass	Cynodon dactylon
	Dogtail grass	Cynosurus echinatus
	Orchard grass	Dactylis glomerata
	Crabgrass	Digitaria sanguinalis
	Saltgrass	Distichlis spicata
	Watergrass	Echinocloa crusgalli
	Rye grass	Elymus canadensis
	Medusa head	Elymus caput-medusae
	Wild rye	Elymus glaucus
	Six-weeks fescue	Festuca octoflora
	Red fescue	Festuca rubra
	Marsh timothy	Heliochloa schoenoides
	Velvet grass	Holcus lanatus
	Wild barley	Hordeum glaucum
	Foxtail barley	Hordeum jubatum
	Spangletop	Leptchloa fascicularis
	Italian rye grass	Lolium multiflorum
	Dallas grass	Paspalum dilatum
	Knot grass	Paspalum distichum
	Canary grass	Phalaris california

Family	Common Name	Scientific Name
Poaceae	Timothy	Phleum pratense
(Continued)	Common reed	Phragmites communis
	Annual bluegrass	Poa annua
	Kentucky bluegrass	Poa pratensis
	Pine bluegrass	Poa scabrella
	Rabbitfoot grass	Polypogon monspeliensis
	Johnson grass	Sorghum halepense
Polygonaceae	Buckwheat family	
	Wild buckwheat	Eriogonum gracile
	Wire grass	Polygonum aviculare
	Lady's thumb	P. persicaria
	Curly dock	Rumex crispus
Portulacaceae	Purslane family	
	Red maids	Calandrinia ciliata
	Miner's lettuce	Montia perfoliata
	Common purslane	Portulaca oleracea
Potamogetonaceae		Potamogeton crispus
	Pond weed	Potamogeton diversifolius
		Potamogeton pusillus
		Potamogeton zosteriformis
Ranunculaceae	Crowfoot family	
	California buttercup	Ranunculus californicus
	Larkspur	Delphinium sp.
Rosaceae	Rose family	
	Wild rose	Rosa californica
	California blackberry	R. ursinus
	Wild blackberry	Rubus vitifolius

Family	Common Name	Scientific Name
Salicaceae	Willow family	
	Fremont's cottonwood	Populus fremontii
	Willow	Salix gooddingii
	Sand bar willow	Salix hindsiana
	Red willow	Salix laevigata
	Golden willow	Salix lasiandra
	Arroyo willow	Salix lasiolepis
Salviniaceae		
	Azolla	Azolla filiculoides
Scrophulariaceae	Figwort family	
	Bacopa	Bacopa eisenii
	Bush monkey flower	Mimulus aurantiacus
	Common monkey flower	Mimulus guttatus
	Mimulus tricolor	Mimulus tricolor
	Parentucellia	Parentucellia viscose
	Bush penstemon	Penstemon brevifloras
	Owl's clover	Orthocarpus densiflora
	Butter and eggs	Orthocarpus erianthus
	Corn speedwell	Veronica arvensis
	Common mullein	Verbascum thapsus
	Moth mullein	Verbascum blattaria
Simarubaceae		
	Tree-of-heaven	Ailanthus altissima
Solanaceae	Nightshade family	
	Jimson weed	Datura stramonium
	Indian tobacco	Nicotiana bigelovii
	Black nightshade	Solanum nigrum
Typhaceae	Cattail family	
	Common cattail	Typha latifolia

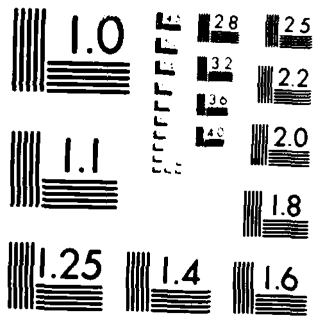
Family	Common Name	Scientific Name
Urticaceae		
	Creek nettle	*Urtica holosericea*
Verbenaceae		
	Garden lippia	*Lippia nodiflora*
	Blue vervain	*Verbena hastata*
Vitaceae		
	Wild grape	*Vitis californica*
Zannichelliaceae		
	Horned pond weed	*Zannichellia palustris*

Appendix G

VERTEBRATES EXPECTEL TO OCCUR ON
McCLELLAN AFB OR ADJOINING LANDS

AD-A124 153 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR MCCLELLAN AIR FORCE BASE CALIFORNIA(U) CH2M HILL GAINESVILLE FL JUL 81 F08637-80-G-0010 3/5

UNCLASSIFIED F/G 13/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

Appendix G
VERTEBRATES EXPECTED TO OCCUR ON McCLELLAN AFB OR ADJOINING LANDS
(From SALC, 1981) [12]

LEGEND:	Status:	PR	Permanent resident
		SR	Summer resident
		WR	Winter resident
		SV	Seasonal visitor
		WV	Winter visitor
	Abundance:	C	Common
		U	Uncommon
		R	Rare
		O	Occasional
		A	Accidental
	Habitat:	1	Woodland and margins
		2	Grassland
		3	*Wetlands (e.g., lakes, ponds, and marshes)*
		4	Riparian
		5	Agricultural

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
FISH		
Carp	Cyprinus carpio	These are all warmwater species found in canals, ditches, sloughs, and slow-moving streams.
Goldfish	Carassius auratus	
Golden shiner	Notemigonus crysoleucas	
Mosquito fish[1]	Gambusia affinis	
Bigscale log perch	Percina macrolepida	
Bluegill	Lepomis macrochirus	
Green sunfish	Lepomis cyanellus	
Warmouth	Lepomis gulosus	

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Brown bullhead	*Ictalurus nebulosus*	
Black bullhead	*Ictalurus melas*	
AMPHIBIANS		
Speckled black salamander	*Aneides flavipunctatus flavipunctatus*	U, 1
Arboreal salamander	*Aneides lugubris*	U, 1
California slender salamander	*Batrachoseps attenuatus*	C, 1, 2, 4
Western toad	*Bufo boreas halophilus*	C, 1, 2, 3, 4, 5
Ensatina	*Ensatina eschscholtzi xanthoptiea*	U, 1, 3
Pacific treefrog	*Hyla .egilla*	C, 1, 2, 3, 4, 5
Foothill yellow-legged frog	*Rana boylei*	O, 4
Bullfrog[1]	*Rana catesbiana*	O, 3
Western spadefoot	*Scaphiopus hammondi*	O, 2, 3, 4
Rough-skinned newt	*Taricha granulosa granulosa*	U, 1, 2, 3, 4
California newt	*Taricha torosa*	U, 1, 2, 3, 4
REPTILES		
Rubber boa	*Charina bottae*	O, 1, 2, 4
Western pond turtle	*Clemmys marmorata*	O, 3
Western whiptail	*Cnemidophorus tigris*	O, 1, 4, 5
Racer	*Coluber constrictor*	O, 1, 2, 4, 5
Sharp-tailed snake	*Contia tenius*	U, 1, 2, 4, 5
Northern Pacific rattlesnake	*Crotalus viridus oreganua*	O, 1, 2, 4

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Ringneck snake	Diadophis punctatus	C, 1, 2, 4, 5
Northern alligator lizard	Gerrhonotus coeruleus	U, 1, 4
Southern alligator lizard[1]	Gerrhonotus multicarinatus	O, 1, 2, 4, 5
California night snake	Hypsiglena torquata	O, 1, 2, 4
Common kingsnake	Lampropeltis getulus	O, 1, 2, 3, 4, 5
Striped racer	Masticophis lateralis	C, 1
Coast horned lizard	Phrynosoma coronatum	U, 1
Gopher snake	Pituophis melanoleucus	C, 1, 2, 3, 5
Long-nosed snake	Rhinochelius lecontei	U, 2
Sagebrush lizard	Sceloporus graciosus	C, 1
Western fence lizard	Sceloporus occidentalis	C, 1, 2, 4, 5
Western *aquatic garter snake*	Thamnophis couchi	C, 3, 4
Giant garter snake	Thamnophis couchi gigas	R, 3
Western terrestrial garter snake	Thamnophis elegans	O, 1, 4, 5
Valley garter snake	Thamnophis sirtalis fitchi	O, 1, 2, 4, 5
MAMMALS		
Pallid bat	Antrozous pallidus	PR, ?, 1, 5
California ground squirrel	Citellus beecheyi	C, 1, 2, 5
Possum	Didelphis marsupialis	C, 4, 5
Heerman kangaroo rat	Dipodomys heermanni	C, 1, 2
Big brown bat	Eptesicus fuscus	PR, ?, 1
Red bat	Lasiurus borealis	SR, ?, 1
Hoary bat	Lasiurus cinereus	SR, 1

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Blacktail hare[1]	Lepus californicus	C, 2
Striped skunk	Mephitis mephitis	C, 1, 2, 5
California vole	Microtus californicus	C, 2, 3, 5
House mouse	Mus musculus	C, 5
Mink	Mustela vison	O, 4
(7 species)	Myotis spp.	PR, C, 1, 4, 5
Muskrat[1]	Ondatra zibethica	O, 6
Deer mouse	Peromyscus maniculatus	C, 1, 2, 3, 4, 5
Western pipistrel	Pipistrellus hesperus	PR, ?, 4
Western big-eared bat	Plecotus townsendi	PR, ?, 1, 2
Norway rat	Rattus norvegicus	C, 5
Western harvest mouse	Reithrodontomys megalotis	C, 2, 4, 5
California mole	Scanapus latimanus	O, 1, 5
Ornate shrew	Sorex ornatus	U, 4, 5
Trowbridge shrew	Sorex trowbridgei	O, 1
Spotted skunk	Spilogale putorius	C, 1, 2, 3, 4
Audobon cottontail	Sylvilagus auduboni	O, 1, 2, 5
Brush rabbit	Sylvilagus bachmani	O, 1
Mexican freetail bat	Tadarida brasiliensis	SR, ?, 1, 5
Badger	Taxidea taxns	U, 2
Valley pocket gopher	Thomomys bottae	C, 1, 5

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
BIRDS		
Cooper's hawk	Accipiter cooperii	WV, U, 1, 4
Sharp-shinned hawk	Accipiter striatus	WV, 0, 1
Spotted sandpiper	Actitis macularia	WV, U, 3
White-throated swift	Aeronaute saxatalis	WV, 0, 1, 2, 5
Red-winged blackbird[1]	Agelaius phoeniceus	PR, C, 3, 5
Tricolored blackbird	Agelaius tricolor	PR, C, 3
Wood duck	Aix sponsa	PR, 0, 4
Grasshopper sparrow	Ammodramus savannarum	SR, C, 2, 5
Pintail[1]	Anas acuta	WV, C, 3
American widgeon	Anas americana	WV, C, 3, 5
Green-winged teal	Anas carolinensis	WV, C, 3
Cinnamon teal[1]	Anas crecca	PR, 0, 3
Blue-winged teal	Anas discors	SR, 0, 3
Mallard[1]	Anas platyrhynchos	PR, C, 3, 4, 5
Gadwall	Anas strepera	PR, 0, 3
Water pipit	Anthus spinoletta	WV, C, 2, 3, 5
Scrub jay	Aphelocoma coerulescens	PR, C, 1, 4, 5
Black-chinned hummingbird	Archilochus alexandri	SR, U, 1, 4, 5
Great blue heron[1]	Ardea herodias	PR, C, 3, 4, 5
Short-eared owl	Asio flammeus	PR, C, 2, 3
Lewis' woodpecker	Asyndesmus lewis	PR, 0, 4
Burrowing owl[1]	Athene cunicularia	PR, 0, 2, 5
Lesser scaup	Aythya affinis	WV, 0, 3

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Redhead	Aythya americana	WV, U, 3
Ring-necked duck	Aythya collaris	WV, C, 3
Canvasback	Aythya valisineria	WV, U, 3
Cedar waxwing	Bombycilla cedrorum	WV, O, 1, 5
American bittern[1]	Botaurus lentiginosus	PR, C, 3
Great horned owl	Bubo virginianus	PR, O, 4, 5
Red-tailed hawk[1]	Buteo jamaicensis	PR, C, 1, 4, 5
Rough-legged hawk	Buteo lagopus	PR, O, 1, 3
Red-shouldered hawk	Buteo lineatus	PR, O, 1, 3
Ferruginous hawk	Buteo regalis	WV, U, 1, 2
Swainson's hawk	Buteo swainsonii	SR, C, 2
Green heron	Butorides virescens	PR, O, 3, 4
Anna's hummingbird	Calypte anna	PR, C, 4, 5
Common snipe	Capella gallinago	WV, C, 3, 4, 5
American goldfinch	Carduelis tristis	PR, C, 2, 5
House finch[1]	Carpodacus mexicanus	PR, C, 1, 2, 4, 5
Great egret	Casmerodius albus	PR, C, 3, 4, 5
Turkey vulture	Cathartes aura	PR, C, 1, 2, 5
Hermit thrush	Hylocichla guttata	WV, O, 5
Killdeer[1]	Charadrius vociferus	PR, C, 3, 4, 5
Lark sparrow	Chondestes grammacus	PR, O, 2, 5
Common nighthawk	Chordeiles minor	SR, O, 2, 5
Marsh hawk	Circus cyaneus	PR, C, 2, 3, 4, 5
Common flicker	Colaptes auratus	PR, C, 1, 4
Band-tailed pigeon	Columba fasciata	PR, O, 1

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Rock dove[1]	Columba livia	PR, C, 5
Common crow[1]	Corvus brachyrhynchos	PR, C, 1, 4, 5
Nuttall's woodpecker	Dendrocopus nuttalli	PR, U, 4, 5
Downy woodpecker	Dendrocopus pubescens	PR, O, 1, 3, 4, 5
Hairy woodpecker	Dendrocopus villosus	PR, O, 1, 4
Yellow-rumped warbler	Dendroica coronata auduboni	PR, O, 1
Yellow warbler	Dendroica petechia	SR, O, 4, 5
Snowy egret	Egretta thula	PR, 8, 3, 4, 5
White tailed kite	Elanus leucurus	PR, C, 1, 2, 3
Willow flycatcher	Empidonax traillii	SR, U, 4
Horned lark	Eremophilia alpestris	PR, O, 2, 5
Brewer's blackbird	Euphagus cyanocephalus	PR, C, 4, 5
Prairie falcon	Falco mexica	PR, U, 1, 2
American kestrel[1]	Falco sparverius	PR, C, 1, 2, 5
American coot	Fulica americana	PR, C, 3
Roadrunner	Geococcyx californianus	PR, O, 1, 2
Common yellowthroat	Geothlypis trichas	PR, U, 3, 4
Sandhill crane	Grus canadensis	SV, C, 1, 2, 3
Blue grosbeak	Guiraca caerulea	SR, C, 5
Black-necked stilt[1]	Himantopus mexicanus	SR, O, 3
Barn swallow[1]	Hirundo rustica	SR, C, 1, 3, 4, 5
Yellow-breasted chat	Icteria virens	SR, O, 4
Northern oriole	Icterus galbula bullocki	SR, C, 4, 5
Tree swallow	Iridoprocne bicolor	PR, O, 3, 4, 5
Varied thrush	Ixoreus naevius	WV, O, 4

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Dark-eyed junco	Junco hyemalis oreganus	PR, C, 1, 4, 5 (migratory)
Loggerhead shrike	Lanius ludovicianus	PR, O, 1, 5
California gull	Larus californicus	WV, O, 4, 5
Ring-billed gull	Larus delawarensis	WV, O, 3, 5
Long-billed dowitcher	Limnodromus scolopaceus	WV, C, 3, 5
California quail[1]	Lophortyx californicus	PR, C, 1, 4
Belted kingfisher	Megaceryle alcyon	PR, O, 4
Acorn woodpecker	Melanerpes formicivorus	PR, C, 1
Lincoln's sparrow	Melospiza lincolnii	WV, O, 3, 4
Song sparrow	Melospiza melodia	PR, C, 3, 4, 5
Mockingbird[1]	Mimus polyglottos	PR, C, 4, 5
Brown-headed cowbird	Molothrus ater	PR, C, 4, 5
Ash-throated fly-catcher	Myiarchus tuberculifer	SR, C, 1
Black-crowned night heron	Nycticorax nycticorax	PR, U, 3, 4
Plain titmouse	Parus inornatus	PR, O, 1
House sparrow	Passer domesticus	PR, C, 1, 5
Savannah sparrow	Passerculus sandwichensis princeps	WV, O, 2, 3, 5
Fox sparrow	Passerella iliaca	WV, C, 1, 4
Cliff swallow[1]	Petrochelidon pyrrhonota	SR, C, 2, 3, 5
Phainopepla	Phainopepla nitens	SR, U, 1
Ring-necked pheasant[1]	Phasianus colchicus	PR, C, 3, 5
Yellow-billed magpie	Pica nuttalli	PR, C, 1, 4, 5
Rufous-sided towhee	Pipilio erythrophthalamus	PR, C, 1, 4
Brown towhee	Pipilio fuscus	PR, C, 1, 4, 5
Vesper sparrow	Pooecetes gramineus	WV, O, 2, 5

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Purple martin	Progne subis	SR, O, 5
Bushtit	Psaltriparus minimus	PR, C, 1
American avocet	Recurvirostra americana	SR, C, 3, 5
Rock wren	Salpinctes obsoletus	SR, U, 2
Black phoebe	Sayornis nigricans	PR, C, 4, 5
Say's phoebe	Sayornis saya	PR, O, 1, 2
Rufous hummingbird	Selasphorus rufus	SV, A
Northern shoveler	Spatula clypeota	PR, C, 3
Lawrence's goldfinch	Carduelis lawrencei	SR, U, 2, 5
Lesser goldfinch	Carduelis psaltria	PR, C, 2
Chipping sparrow	Spizella passerina	WV, O, 1, 2, 5
Rough-winged swallow	Stelgidopteryx ruficollis	SR, O, 3, 4
Starling[1]	Sturnus vulgaris	PR, C, 1, 5
Western meadowlark[1]	Sturnella neglecta	PR, C, 2, 5
Violet-green swallow	Tachycineta thalassina	SR, C, 5
Long-billed marsh wren	Telmatodytes palustris	PR, C, 3
Bewick's wren	Thryomanes bewickii	PR, C, 1, 4
Lesser yellowlegs	Tringa flavipes	WV, O, 3
Greater yellowlegs	Tringa melanoleucas	WV, O, 3
House wren	Troglodytes aedon	PR, O, 1, 4, 5
American robin	Turdus migratorius	PR, C, 4, 5
Western kingbird	Tyrannus verticalis	SR, C, 1, 4, 5
Barn owl	Tyto alba	PR, O, 1, 2, 5
Warbling vireo	Vireo gilvus	SR, O, 1, 5
Hutton's vireo	Vireo huttoni	PR, O, 1

Common Name	Scientific Name	Status, Abundance, and Habitat[1]
Solitary vireo	Vireo solitarius	SR, O, 1
Mourning dove[1]	Zenaidura macroura	SR, C, 1
White-throated sparrow	Zonotrichia albicollis	WR, C, 1
Golden-crowned sparrow	Zonotrichia atricapilla	WV, C, 1, 4
White-crowned sparrow	Zonotrichia leucophrys	WV, C, 1, 4, 5

[1]Species were sighted during April 30, 1981 field survey.

Appendix H

GEOLOGY

Appendix H
GEOLOGY

1. Physiography/Topography/Drainage

McClellan AFB and the offsite facilities are all located in the Great Valley Physiographic Province as illustrated on Figure 4. The Great Valley extends from Red Bluff in the north, south approximately 400 miles to Bakersfield [14]. The valley averages 40 miles in width. The Sacramento and the San Joaquin River Valleys together form the Great Valley Physiographic Province [14]. In the McClellan area, the Sacramento Valley is further subdivided into the American Basin, the Yolo Basin, and alluvial plains of the Sacramento River [14].

The American and Yolo Basins are referred to as flood basins, since this is where overflow waters have deposited generally fine-grained materials in the past. The alluvial plains border the river channel and flood basins extending almost to the valley boundaries. The valley is surrounded by low hills and terraces dissected by a number of stream channels. Some of the hills such as the Dunnigan, Rumsey, English, and Montezuma Hills attain elevations of 65 to 1,640 feet above the valley floor [14].

There are two prominent features of volcanic origin located some distance north of McClellan AFB. These two features outcrop through the alluvial materials of the valley. One, Sutter Buttes, are remnants of an old volcano. The other, Orland Buttes, are a ridge capped by volcanic rock rising about 600 feet above the surrounding area [14].

The principal physiographic features of the valley are the river channels, flood plains, alluvial plains and fans, and river flood plains. The Sacramento River flood plain extends from Red Bluff to the San Joaquin Delta just south of Sacramento. North of Colusa, the flood plain attains its greatest width (approximately 8 miles). In the Red Bluff to Colusa reach, a linear distance of about 75 miles, the average flood-plain width is about 3.75 miles, and its gradient is about 1.6 feet/mile. In this reach, much of the river's bedload of gravel and sand is deposited, and the suspended silt load is deposited on the broad flood plain. The river course is sinuous, with many bends and meanders [14].

Below Colusa, the river takes a more southeasterly course, and the flood plain narrows except where it is joined by the Feather and American Rivers. The American River originates in the Sierra Nevada and flows past McClellan AFB just to the south and joins the Sacramento River just north of the downtown area of the City of Sacramento [14].

Two distinct flood basins, the American and the Yolo, occupy lands adjacent to the Sacramento flood plains in the vicinity of McClellan AFB. These basins are broad, shallow troughs lying between the natural levees and low alluvial plains and fans on both sides of the valley. These basins are typified by flat, poorly drained land which have received flood waters as the natural levees were overtopped. Sediments deposited in these basins are the fine-grained portion of the suspended load; the soils are heavy-textured clay and adobe types. A shallow water table is common, and conditions are excellent for growing rice [14].

McClellan AFB and the Lincoln site are located within the alluvial plain. Camp Kohler, River Dock, and the McClellan Storage Area are located within the flood plain. The Davis site is located within the Yolo Basin.

The topography at McClellan is typical of an alluvial plain that is relatively flat. As seen on Figure 5, elevations range from 75 feet above mean sea level (msl) on the east side of the base to approximately 50 feet above msl on the west side. The flat plain is dissected slightly by tributaries of the Sacramento and American Rivers. Magpie Creek is the most prominent natural drainage feature at McClellan AFB. This creek, modified somewhat by channelization, traverses the base from east to west discharging to the Natomas East Main Drainage Canal and ultimately to the Sacramento River [18].

The natural drainage patterns at McClellan AFB have been modified by construction of a series of storm drains [17].

Runoff from streets and runways is directed into this system and conveyed westward leaving the base through Magpie or Arcade Creek. Figure 5 illustrates the general drainage pattern at McClellan AFB [17].

2. Surface

McClellan AFB is located on alluvium deposited from the flooding of the Sacramento and American Rivers. The materials occurring at the surface are generally a sandy loam. The surficial deposits are of Recent age [15]. Figure 6 illustrates the areas distribution of surface deposits.

3. Subsurface

McClellan AFB is located within the Sacramento Valley, which is a large northwest trending structural trough extending from Red Bluff to the Sacramento-San Joaquin Delta, a distance of approximately 150 miles [15]. This trough covers an area of approximately 3.8 million acres. The valley is bounded on the east by the Sierra Nevada and Cascade Ranges and on the west by the Coast Range. Materials underlying the basin and the adjacent mountains include Paleozoic and Mesozoic (70 to 400 million years ago) granitic, metamorphic, and marine sediments [15]. As illustrated on Figure 7, the geologic cross section taken in an east-west direction through the basin, these so-called "basement rocks" occur at shallow depths at the basin edge but are very deep near the center [15]. This basement complex is overlain by a thick sequence of Eocene (34 million years ago) marine and continental sedimentary rock which contains saline or brackish water. These rocks are impermeable and form the bottom of the basin, with no freshwater occurring below them [15].

Overlying the older sequence of Eocene and pre-Eocene rocks is a series of continent deposits, non-marine in origin, of post-Eocene age (younger than 34 million years), which generally contain freshwater. These post-Eocene sediments were deposited by streams flowing from the surrounding mountains into the subsiding depositional trough. This assemblage of predominantly sedimentary rocks also includes volcanic mud flows, lava flows, and ash deposits associated with the volcanism occurring in the middle to late Tertiary period (1 to 70 million years ago). Sutters Buttes, located approximately 45 miles north of McClellan AFB, are prominent volcanic features which originated during the late Tertiary period [14, 15].

The post-Eocene deposits within the basin include several formations which are important sources of ground water. These include the Ione, Valley Springs, Mehrten Laguna, Fair Oaks, Arroyo Seco Gravels, and Victor Formations, as well as several unnamed alluvial deposits, principally alluvial fans and flood-plain deposits [14, 15]. Figure 8 illustrates the thickness of post-Eocene deposits in the area.

Table H-1 lists the geologic formations in the McClellan AFB area and includes a brief description of the formations' physical characteristics. Also listed in Table H-1 is a description of the formation water-bearing characteristics.

The following discussions regarding the lithologic units within Sacramento County and underlying McClellan AFB are excerpted from Department of Water Resources Bulletin No. 118-3 entitled "Evaluation of Ground Water Resources: Sacramento County," July 1974, [14].

> The geologic formations of Sacramento County have been divided into two groups: nonwater-bearing and water-bearing. This division is based on the ability of the formation to yield significant quantities of water to wells. As used in this report, water-bearing materials are those that absorb, transmit, and yield water readily to wells. Conversely, nonwater-bearing materials are those from which wells produce only limited quantities of usable water or produce water that is of unusable quality. In general, this division also can be based on age, because the water-bearing materials generally include formations that are geologically young while the nonwater-bearing group includes those that are older than Tertiary.... Each unit is discussed in some detail below.

Table H-1
GEOLOGIC FORMATIONS IN SACRAMENTO COUNTY [15]

Geologic Age			Formation	(feet)	Physical Characteristics	Water-Bearing Characteristics
Cenozoic	Quaternary	Holocene	Alluvium	0-100±	Unconsolidated gravel, sand, silt, and clay deposited along stream channels, on terraces and floodplains, and in basins.	Gravels and sands act as important recharge areas and yield large amounts of water to wells. Silts and clays are of low permeability and yield little water.
Cenozoic	Quaternary	Pleistocene	Victor Formation	0-100+	Unconsolidated sand, silt, and clay. Hardpan present. Sand and gravel along old stream courses.	Generally yields little water. Yields larger amounts of water if old stream channels tapped.
Cenozoic	Quaternary	Pleistocene	Arroyo Seco Gravel	20-50	Sand and gravel in iron-cemented clay matrix.	Of relatively low permeability and thus would yield only small amounts of water to wells.
Cenozoic	Quaternary/ Tertiary	Pliocene to Pleistocene	Fair Oaks Formation	0-225+	Sand, silt, and clay. Hardpan present. Found principally north of American River. Cemented gravels south of the river.	Similar to the Victor Formation.
Cenozoic	Quaternary/ Tertiary	Pliocene to Pleistocene	Laguna Formation	125-200	Bedded silts, clays, and sands. Nonvolcanic.	Sand beds will yield moderate amounts of water to wells; clays yield little water.
Cenozoic	Tertiary	Pliocene	Mehrten Formation	200-1,200	Beds of black volcanic sand, brown clay and sand; zones of volcanic tuff-breccia (lava). All of andestic origin.	Volcanic sands yield large quantities of water to wells. Brown sands yield lesser amounts; clays yield little water. Tuff-breccias yield no water.

Table H-1
GEOLOGIC FORMATIONS IN SACRAMENTO COUNTY [15]

Geologic Age			Formation	(feet)	Physical Characteristics	Water-Bearing Characteristics
Cenozoic	Tertiary	Miocene	Valley Springs Formation	75-125	Beds of light colored sand and ash, beds of greenish brown silty sand, few beds of gravel. All of rhyolitic origin.	Of low overall permeability. Yields only small amounts of water to wells.
Cenozoic	Tertiary	Eocene	Ione Formation	100-400	Medium-grained quartz sandstone, thick beds of white to red clay, blue to gray clay with lignite.	Of low overall permeability. Yields only small amounts of fresh to brackish water to wells.
Mesozoic	Cretaceous		Chico Formation	200-15,000±	Brown marine fossiliferous sandstone and and shale. Occurs principally in the subsurface.	Usually nonwater-bearing; contains salt water. Local areas may be flushed and now contain usable ground water.
Pre-Tertiary			Basement Complex	?	Slate and sandstone of the Mariposa Formation. Greenstone, schist, and assorted metavolcanics of the Logtown Ridge Formation. Granodiorite and other intrusive rocks of the Sierra Nevada.	Essentially nonwater-bearing. Where sufficiently decomposed and/or fractured may yield small quantities of water to wells.

From: California Department of Water Resources, Bulletin No. 118-3, 1974.

Nonwater-Bearing Rocks

Rock types of the nonwater-bearing series are exposed only in the far eastern portion of Sacramento County. These rock types also underlie the more recent water-bearing series at depths ranging from a few feet on the east to over 1,500 feet in the central and western parts of the County.

All of the rock types comprising the nonwater-bearing series are consolidated and of low permeability; most of them do not have primary openings large enough to allow an appreciable movement of ground water. Ground water contained in these rock types exists largely in secondary openings formed by fractures, joints, shear zones, and faults. The secondary openings provide minimal storage space and avenues for movement of ground water. This explains the ability of rocks of this group to provide small quantities of water to wells. Because secondary openings are not present uniformly in any given rock type, the ability of the rock to yield water to wells is variable and is dependent largely on local conditions. The hydrologic importance of the rocks of the nonwater-bearing series lies primarily in their ability to yield small amounts of ground water to springs, thus providing perennial flow in many streams draining the highlands that would otherwise be dry in summer.

The quality of water contained in the nonwater-bearing rocks often is poor. Nonwater-bearing rocks of Cretaceous age are of marine origin and consequently contain water that is of connate origin, that is, deposited at the time the sediments were laid down. As these deposits were formed in a saline environment, the connate water contained therein is also highly saline.

Metamorphic Rocks

Metamorphic rocks are exposed in the north-eastern part of Sacramento County from Highway 16 (Jackson Road) east of the Consumnes River north to the American River at Folsom. These rocks are a part of the basement complex and were formed prior to the Nevadan Orogeny.

The major portion of this metamorphic suite of rocks is composed of amphibolite, greenstone, and other meta-igneous rocks belonging to the Logtown Ridge Formation of Carboniferous age. Distinctive outcroppings of white quartz, for which the community of White Rock was named, occur as steeply dipping veins up to 10 feet in thickness. Occurring as discontinuous belts within the Logtown Ridge Formation are beds of slate and shale belonging to the Mariposa Formation of Jurassic age. All of the metamorphic rocks have been deformed into isoclinal folds and now dip nearly verticially. Their strike is roughly parallel to the axis of the Sierra Nevada.

Because of the thin soil mantle, runoff from precipitation is large and little or no water infiltrates the ground. These rocks yield little if any water to wells except in a few areas such as fractured quartz veins. Wells which tap fracture systems probably yield only a few gallons per hour. The quality of this ground water is expected to be acceptable for most domestic purposes.

Granitic Rocks

Significant outcrops of granitic rocks occur only north of the American River, in the northeastern portion of Sacramento County. Minor exposures of this rock type also occur to the south near the Cosumnes River and along Scott Road.

The granitic rocks are a portion of the Sierran batholith which was emplaced during late Jurrassic and early Cretaceous time. These rocks range in composition from granite to gabbro, with granodiorite and quartz being the most common.

Yields of wells drilled into the granitic rocks are generally meager. Wells tapping the fracture systems may yield as little as one gallon per minute. Shallow wells drilled into areas of decomposed granite may expect only a few gallons per minute as an average yield. The quality of water derived from the fractures systems and from the decomposed granite generally is good to excellent.

Marine Sediments

There are only two areas of outcrop of marine sediments in Sacramento County. One is to the northwest of Folsom, in the vicinity of the intersection of Greenback Lane and Auburn-Folsom Road. The other is along Scott Road, north of Carson Creek.

At the Folsom location, the marine sediments are composed of fairly soft brown sandstone containing abundant mollusks and pelecypods, which indicate a Cretaceous age. The sediments here appear to have a stratigraphic thickness of about 50 feet and rest on an eroded surface of granitic rocks. They are overlain by volcanic sediments of Miocene age, indicating that this exposure is but an erosional remnant of a much thicker section of sediments at this location. The sediments along Scott Road are of similar lithology and also contain abundant fossils. They unconformably overlie the metamorphic rocks and are in turn overlain by Eocene sediments.

These marine sediments represent portions of the eastern edge of a Cretaceous wedge of sediments. To the west these sediments dip beneath the floor of the Great Valley and thicken appreciably. They attain thicknesses of upwards of 12,000 feet where they are exposed to the west in the Coast Ranges.

Although the Cretaceous sediments are somewhat permeable, wells tapping them would be expected to yield saline water. Exceptions may occur in areas of outcrop where flushing has removed the saline water and replaced it with fresh water derived from precipitation and runoff. In such limited areas these sediments may be expected to yield small quantities of fair to good quality ground water, suitable for most domestic purposes.

Water-Bearing Rocks

The formations comprising the water-bearing sequence range in age from Eocene to Holocene, and in lithology from sandstone to clay and conglomerate. The mode of origin is as varied as the lithology, as the sequence includes sediments of subaqueous and subaerial deposition as well as those of volcanic origin. Most, if not all of these water-bearing units yield moderate to copious quantities of water of good to excellent quality. Exceptions are certain beds which yield brackish water or water locally degraded by deleterious minerals. Also an exception are the massive volcanic beds which more closely resemble a nonwater-bearing rock due to their extremely low permeability.

Ione Formation

The Ione Formation is divisible into three distinct members, only the upper two of which are exposed in Sacramento County. The uppermost member of the formation is composed principally of a uniformly graded, medium to coarse-grained quartz sandstone. This sandstone, which ranges from soft to very hard, diagnostically contains abundant flakes of white anauxite, a micaceous clay produce derived from the weathering of Sierran graodiorite. Included with the sandstone, which is not everywhere present, are discontinuous lentils of white milky quartz. Stratigraphically, below the sandstone is a thick bed of white clay of ceramic quality. Like the sandstone, anauxite is abundant, indicating deposition in quiet water. In some areas this clay has been stained red to yellow. Where the staining is intense, the clay has become iron cemented and is present as ocher. The staining is derived from the precipitation of limonite from ground water moving from areas of deeply weathered bedrock. The deeply weathered areas were probably once extensive swamps and bogs which existed in a subtropical climate.

Although not exposed on the surface in Sacramento County, the Ione Formation also contains a thick lower member composed of blue to gray clay and occasional seams of brown coal and lignite. At the base of the formation is reported to be a zone of gravel composed of quartz and metamorphic fragments.

Valley Springs Formation

The Valley Springs Formation typically exhibits a somewhat greenish cast to the clayey members. This, in addition to the presence of acidic volcanic ejecta, serves to distinguish it from the underlying nonvolcanic Ione Formation and the overlying basic volcanic units. The formation typically contains varying amounts of rhyolite ash, vitreous tuff, quartz sand containing abundant glass shards, and pale colored beds of ashy clay. Frequently sediments of the formation contain fragments of pumice, some of which may be as much as one-quarter inch in diameter.

Mehrten Formation

The Mehrten Formation is divisible into two strikingly different units. One is a sedimentary unit composed of gray to black andesitic sands reported by well drillers as "black sand" and interbedded blue to brown clay. The other is a hard, gray tuff-breccia reported by well drillers as "lava".

The black sands generally are fairly soft and are well sorted. They were formed as fluvial deposits having been derived from andesitic detritus washed down the slopes of the mountains. Frequently laminated, the beds of black sand are commonly about five feet thick, although beds up to twenty feet or more have been reported. Where exposed in road cuts, these beds exhibit cross-bedding and foreset bedding, indicating a beach or deltaic mode of origin. Pebbles and cobbles of hard andesite are common along certain horizons. These fragments are well rounded and are locally spoken of as "fossilized goose eggs".

Associated with the black sands are lenticular beds of stream gravel containing andesitic cobbles and boulders up to several feet in diameter. Also associated with the sands are beds of brown to blue clay and silt.

Near the base of the Mehrten Formation is a fairly thick bed, or series of beds, of hard gray sandstone. This sandstone is not over 25 feet thick and is even grained, being composed of quartz and dark minerals. The gray cast is given by grain coatings of authigenic montmorillonoid, a translucent fibrous clay. The clay coating has precipitated from solutions permeating the sandstone and probably was derived from the solution of andesitic rock fragments contained in parts of the sedimentary mass. Associated with the gray sandstone are thin, irregular beds of subaqueous laminated tuff which was deposited in bodies of quiet water. Some of the tuffaceous material was probably derived by reworking of the underlying Valley Springs tuffs.

The second major unit of the Mehrten Formation is the tuff-breccia. This rock is very dense and hard. It is composed of angular pieces and blocks of black, gray, and red fine-grained to porphyritic andesite which range from less than an inch to over several feet in diameter. The fragments are contained in a highly cemented ground mass composed of andesite lapilli and tan to gray ash.

The tuff-breccia was derived from andesitic eruptions to the east in the Sierra Nevada. During these eruptions, great quantities of highly mobile ash flowed down the then existing stream channels. In moving westward the ash picked up blocks of andesite debris which was incorporated into the mass. Moving into the valley, the mass spread out over the westward sloping plains and solidified as a pavement of hard, concrete-like rock which ranged from only a few feet to over 30 feet in thickness.

Flow patterns are readily evident where the upper surface of the tuff-breccia is now exposed. On this surface soil cover is scant or nonexistent, with the blocks of andesite usually standing out in bold relief giving the appearance of a boulder-strewn field. Because of the nature of the rocky surface, runoff from precipitation is nearly 100 percent. The only infiltration is along thin vertical fractures which developed normal to the direction of flow.

The presence of the flat-lying beds of tuff-breccia gives rise to the many "haystack" hills or mesas commonly found in the eastern part of the County. The table lands, which have only a thin soil cover supporting annual grasses, have relatively steep sides composed of the underlying softer sediments. Intervening swale areas frequently contain a pavement of tuff-breccia representing an earlier episode of volcanism.

Laguna Formation

The Laguna Formation is strikingly different from the underlying Mehrten Formation. Whereas the Mehrten Formation is andesitic in character and generally dark colored, the Laguna Formation is nonvolcanic and generally is a tan to brown in color. It is composed of a heterogeneous assemblage of beds of silt, clay, and sand with lenticles of gravel deposited on westward sloping flood-plains by meandering, sluggish streams. Some of the sands are clean and well sorted; conversely, some of the gravels are extremely silty and poorly sorted.

The mineralogy of the particles in the Laguna Formation is decidedly granitic. Flakes of mica are locally abundant and serve as a distinguishing characteristic of much of the formation. The gravels are mostly from granitic and metamorphic rocks; little or no volcanics are present.

The nature of the sediments of the Laguna is locally variable. For example, in one area the formation consists of compact silt, clay, and lenses of poorly softed gravel, sand, and silt. In other areas the Laguna contains sand with only a few interbeds of clay and silt.

Fair Oaks Formation

The Fair Oaks Formation is composed of poorly bedded silts, clays, and sand with occasional lenses of gravel. The sediments bear a strong resemblance to those of the Laguna Formation. A diagnostic feature of the Fair Oaks appears to be numerous beds of white to gray-white tuff and tuffaceous silts. These beds are up to one foot thick and are exposed in road cuts throughout the area of outcrop. No beds of a similar nature have been noted in the exposures of the Laguna Formation. Beds of this type appear to be a distinguishing feature of the Fair Oaks Formation.

Arroyo Seco Gravels

The Arroyo Seco Gravels are composed of discontinuous beds and lentils of stream laid detritus. This material was deposited as a pediment, or constructional plain, by many rivers and streams of greater competence which drained the Sierra Nevada during the middle and latter parts of the Pleistocene epoch.

The Arroyo Seco is easily distinguished from the underlying materials by the coarseness of the particles and the red color of the iron oxide cement. The Arroyo Seco is made up of well rounded pebbles and cobbles of dark colored metamorphic rocks (about 40 percent of total), weathered Mehrten andesite (about 30 percent of total) with lesser amounts of white quartz, dark chert, and other rocks. Occasional fragments of granitic rocks weathered to grus also occur. All of these rock fragments are contained in a matrix of iron-cemented granitic sand and clay.

Gravels of Uncertain Age

Small areas of Gravels of Uncertain Age occur capping hilltops east of Folsom and at other localities in the eastern part of Sacramento County. These gravels are similar to the Arroyo Seco gravels, and in fact may be related to them. As no diagnostic evidence has been developed that definitely links them to any other gravel deposit in Sacramento County, they are termed as being of uncertain age.

Because these gravels are perched above the surrounding lowlands, they are considered as being nearly devoid of ground water. Thus, as they have no hydraulic connection with any water-bearing unit, they are of little importance to ground water in Sacramento County.

Victor Formation

The Victor Formation is composed of interbedded granitic sand, silt, and clay with lenses of metamorphic channel gravels. The lithology bears a striking similarity to that in the Laguna and Fair Oaks Formations, making it nearly impossible to differentiate the formations on the basis of well log data. The lithology of the Victor is heterogeneous and laterally and vertically discontinuous, indicating a fluviatile environment. The apparent extreme variability of grain size also is the result of many intricately braided stream channels. For this reason it is usually not possible to correlate from well to well, even though well spacing may be as close as 1,000 feet.

Well log data indicate that the grain size in the Victor Formation tends to decrease toward the west. The percentage of reduced clay also increases toward the west, suggesting a mode of deposition in a shallow body of water.

The surface soils of the Victor Formation diagnostically contain a layer of hardpan. The occasional stringers of gravel contain an average of 80 percent dark metamorphic gravels and less than 5 percent each of quartzite, light metamorphics, dark igneous, and chert.

Alluvial Sequence

The alluvial sequence, of Holocene age, is divisible into six separate units. The various units occur along present stream channels and also underlie the islands of the Sacramento-San Joaquin Delta. Certain alluvial units also occur in other areas of recent sedimentation such as the American Basin. Each of these units is briefly described below.

Floodplain Deposits. Unconsolidated deposits of clay, sand, and silt occur as floodplain deposits adjacent to the Sacramento River. The deposits were formed from winter overwash of the river and are part of the natural sedimentation taking place in the Sacramento Valley. These deposits overlie sediments of the Victor Formation and are at most about 50 feet thick.

Basin Deposits. Basin deposits, consisting of unconsolidated beds of clay, occur under the American Basin and at other localities in the western part of Sacramento County. The deposits were formed in local sink areas and represent the finest grained materials deposited from winter overwash. The deposits interfinger with the floodplain deposits; they overlie the Victor Formation.

Muck and Peat. Deposits of muck, peat, and related organic clay occur in nearly all of the islands of the Sacramento-San Joaquin Delta. Although containing a moisture content upwards of 200 percent, the deposits are of very low permeability. They were formed in backwater areas at or near sea level and represent an accumulation of tules, reeds, and other vegetative matter. The deposits commonly overlie the Victor Formation. Near the central part of the Delta they may overlie river deposits or other alluvial materials of varying permeability.

Sand Deposits. Isolated deposits of aeolian sand occur throughout the Delta area. These deposits are composed of wind-blown river sand that is heaped into small dunes. The deposits are usually underlain by alluvial or organic sediments. They are highly permeable and provide infiltration areas for precipitation.

Stream Channel Deposits. Deposits of unconsolidated sand and gravel occur as streambed deposits and point bar deposits. The deposits overlie those of the Victor Formation, as well as other alluvial materials. Being generally very permeable, the deposits afford large areas for infiltration of surface water to the ground water body.

Valley Alluvium. Stringers of valley alluvium extend along the many westward draining stream courses. These materials, such as found along the Cosumnes River and along Dry Creek, consist of unconsolidated deposits of sand, silt, clay, and occasional lenses of water-worn gravel. Permeabilities vary from fairly high to low, and in certain areas the valley alluvium acts as an important recharge area for percolating surface water to enter the ground water body.

4. Soil

Most of the soil cover at McClellan AFB to a depth of approximately 4 feet consists of a sandy loam. This soil type, referred to as San Joaquin sandy loam, undulating, is described as follows in a soil survey prepared by the U.S. Department of Agriculture [13].

San Joaquin sandy loam, undulating (3-8 percent slopes) (Sh).--This soil occurs on gentle slopes cut by many small drainageways. The profile is essentially the same as that of San Joaquin sandy loam, very gently undulating.

The old valley plain this soil occupies is crossed by numerous small entrenched drainageways that increase the unevenness of the relief. The microrelief is somewhat hummocky and characterized by many small mounds that rise 12 to 20 inches above the adjacent depressions. These mounds are neither so regular nor so well-developed as those of San Joaquin soils farther south, as they have a distinct hogwallow microrelief.

The surface soil ranges from 4 to 14 inches deep and averages about 6 inches. It is a light-brown or reddish-brown strongly to medium acid sandy loam (pH 5.0 to 6.) that contains many fine roots, puddles easily, and dries out moderately hard.

The upper subsoil extends to depths of 12 to 30 inches; it is a reddish-brown loam or light clay loam that contains more pores than the surface soil but fewer roots. It may be slightly mottled with rust-brown iron stains and have some buckshotlike iron pellets in the lower part. The pH, which is slightly higher than for the surface soil, increases somewhat with depth. The deeper subsoil is reddish-brown or brown, compact clay. This material has a prismatic or cubical structure when dry, and the aggregates are heavily coated with colloidal stainings. Many small buckshotlike iron pellets occur in this layer. The color becomes increasingly more grayish with depth; and, in some places immediately above the impervious hardpan, it is olive gray. The reaction is neutral or slightly basic, and a little segregated lime may occur as thin seams just above the hardpan.

> The hardpan may be 15 to 42 inches below the surface but is usually between 20 and 24 inches. This material is harder in the upper part than below, and is inclined to be platy. Manganese stains occur along seams and cracks, and some lime may be present. The lower part of the hardpan is stratified, softly consolidated material very similar to the parent material of the Whitney or Pentz soils.
>
> The soil is used mainly for dry-farmed grain and poultry raising. Most of the poultry feed is grown elsewhere, although some local grain is used in ready-mixed feeds, and many poultry farms have small acreages of Ladino clover adjoining their poultry houses. North of North Sacramento large areas of this soil are divided up into 1/2- to 3-acre tracts, which people employed in Sacramento use for homesites and for small family gardens, a few fruit trees, some poultry, and occasionally a cow. Under these conditions yields are variable but usually fairly low, because the farms are not operated as efficiently as commercial farms or poultry plants. The grain yields are similar to those obtained on San Joaquin sandy loam, very gently undulating. Erosion of this soil is slight, except for a few places where some gullying occurs near drainageways.

This soil type was derived from old mixed alluvium and has a light-brown or reddish-brown acid surface soil which is moderately hard when dry. The subsoil is generally brown or reddish-brown neutral clay over hardpan. The surface soil is moderately permeable, but the subsoil has a very low permeability. Surface runoff from this soil is slow to medium, and the water table is low. The soil has a low available water holding capacity and a slight erosion hazard. These soils are low in natural fertility [13, 14].

These soil types cover all of McClellan AFB with the exception of one small area in the vicinity of Gates 2 and 3. This area, consisting of approximately 2 acres, is covered with a sandy loam also referred to as the Whitney fine sandy loam, rolling and hilly, described by the U.S. Department of Agriculture as follows [13]:

> Whitney fine sandy loam, rolling and hilly (8-25 percent slopes) (Wd).--The surface soil is light-brown or nearly reddish-brown, friable fine sandy loam with a strongly to slightly acid reaction (pH 5.0 to 6.5). The color varies considerably but is dominantly more brownish on the knolls and crests of small ridges and more reddish on the slopes.
>
> The subsoil, at depths of 6 to 24 inches, is slightly redder and of similar or slightly finer texture. The reaction is about the same as for the surface soil or slightly less acid (pH 5.5 to 7.0). At a depth of 25 to 35 inches, the subsoil may rest abruptly on softly consolidated pale-brown, grayish-brown, or light brownish-gray stratified sedimentary deposits of sand and clay. In places a layer of brown or reddish-brown clay or sandy clay, which is plastic and sticky when wet, lies directly above the bedrock. This clay or sandy clay layer probably represents a zone of finer textured stratified weathered bedrock.
>
> Slopes are short, and the bedding planes of the bedrock are nearly horizontal. The material appears to have been originally a nearly flat plain with a gentle westward slope into which drainageways have cut in a dendritic pattern.
>
> The original cover was mostly grasses and oaks up to about 2 feet in diameter. Only a few small virgin areas remain in woodlots, and most of the soil has been cleared and farmed for some time. Good stands of annual grasses and other pasture plants are produced. Grain, mostly dry-farmed wheat, is the principal crop near Antelope. Summer fallowing is usual. The Fair Oaks, Carmichael, Citrus Heights, and Orangevale districts have been subdivided into 1- to 20-acre residential and garden areas, the owners of which derive part of their income from work in Sacramento or in the railroad shops and yards at Roseville (in Placer County).

> Citrus fruits, deciduous fruits, grapes, berries, vegetables, and some Ladino clover are grown. Many farmers raise some chickens, a cow or two, tend a small orchard made up of a number of kinds of fruit trees, some Ladino clover or Sudangrass, and some grapes, olives, and almonds. Under such part-time farming, proper care cannot be given to trees or vines, and yields are usually low and of inferior quality. Olives and almonds do better than other orchard crops. Citrus fruits are often injured by frosts, which make their culture economically uncertain.
>
> This soil is fairly erosive. Clean-cultivated fields and some fallow land and grain fields show considerable evidence of erosion. Pastures or orchards protected by cover crops or a good growth of weeds during the rainy season are very little eroded. No erosion control measures other than cropping systems were in evidence during the survey.

This soil type developed from light or reddish-colored, softly consolidated clayey or sandy sedimentary rock. The surface soil is light-brown or reddish-brown, slightly to strongly acid, and quite friable. The subsoil is slightly redder than the surface soil and in places finer in texture. Soil permeability of both the surface and subsoils is moderate. Runoff from this soil type is medium to rapid, and the water table is low. The soil has a moderate available water holding capacity and erosion hazard. Natural fertility is also moderate [13, 14].

5. Ground Water

Most rocks and sediments contain numerous open spaces or voids, in which water may be stored and through which water can move. Water that occurs in these voids is called subsurface water and that part of the subsurface water in voids completely saturated with water is called ground water. Fresh ground water occurs at McClellan and the surrounding area in a wide variety of geologic materials within the post-Eocene (younger than 34 million years) continental deposits beneath the Sacramento Valley. Figure 8 illustrates the approximate thickness of these post-Eocene deposits which contain freshwater [24]. Most of the ground water available for development is stored and moves through sand or sand and gravel strata deposited by streams flowing into and through the Valley [14, 15]. Figure 9 illustrates the elevation of the base of freshwater in the vicinity of McClellan AFB.

These streams, flowing from the upland areas in the Sierra Nevada, have transported the products of weathering and erosion to the Valley. These products of erosion carried by streams include visible rock particles, as well as dissolved minerals. The deposition of coarser materials, such as sand and gravel has occurred along the stream channels and throughout their existence streams have wandered across the valley floor in response to varying geologic and hydrologic conditions [14, 15].

In the McClellan area groundwater occurs under three different conditions, i.e., confined, unconfined, and perched [14]. A confined aquifer is one in which groundwater is held under pressure by overlying and underlying beds of very low or no permeability. This type of aquifer is also referred to as an artesian aquifer. Confined aquifers are classified as leaky or nonleaky depending upon whether the confining beds allow some or no water to pass through. Water levels in artesian aquifers rise above the top of the aquifer and in some cases above land surface resulting in a flowing well.

An unconfined aquifer is one in which ground water possesses a free surface open to the atmosphere. The upper surface of ground water under this condition is called the water table. Changes in the stage of the water table correspond to changes in thickness of the aquifer.

A perched condition occurs when ground water is held above the regional water table by an impermeable layer separating from the saturated materials below.

The direction and rate of ground-water movement within an aquifer is dependent on permeability elevation head, hydraulic gradient, as well as structural barriers. Under natural conditions, that is no removal of water by pumping, ground water in the McClellan area moved from a potentiometric high near Folsom westward toward Sacramento where flow then paralleled the Sacramento River. Figure 10 illustrates the potentiometric surface in 1912, a time when ground-water withdrawls were very low [24]. This illustration can be interpreted as a baseline, natural groundwater condition, as if no pumping were taking place. From this illustration it is clear the flow is from the Sierra Nevada to the river. The Sacramento River is receiving ground water as part of its base flow [24].

Potentiometric maps prepared at a later date show the influence ground-water withdrawals have on the aquifer. Figure 11 illustrates the potentiometric surface during the spring of 1968 [14]. From this illustration, it can be seen that ground-water flow in the McClellan area is influenced by centers of pumping located northwest and southwest of McClellan AFB. The regional flow within the aquifer has probably remained the same but local variations in flow paths have undoubtedly occurred. Also of significance, the Sacramento River no longer receives but discharges water to the aquifers becoming a source of recharge. Figure 12 illustrates a potentiometric map prepared in spring of 1971 which illustrates the same features as did the 1968 map [24].

Comparing Figures 10 and 11 with Figure 12, an important point is clear. In 1912, or prior to any significant ground-water pumpage, the elevation of the ground water at McClellan stood at approximately 30 feet above msl. The ground elevation at McClellan AFB is approximately 75 feet msl. Therefore, depth to water level was approximately 45 feet below land surface in 1912 [14, 24].

Currently, the County of Sacramento obtains approximately one-half of its water supply from wells. McClellan AFB provides all of its water supply from ground water. In addition Arcade Water District and Rio Linda Water District use ground water [25]. As a result of this increase in ground-water use, the potentiometric surface at McClellan AFB stands at approximately 15 feet below msl. With a ground elevation of approximately 75 feet above msl, the present depth to water level is approximately 90 feet below land surface. This represents a 45-foot decline in the water level at McClellan AFB during a 69-year period.

Ground-water level changes have been dramatically influenced by pumpage. In addition, ground-water levels fluctuate annually in response to recharge from stream percolation, infiltration from rainfall, and applied irrigation water. Levels are usually highest in the spring and lowest in the fall. The influence of ground-water withdrawals on water levels is of the greatest significance [14, 15, 24].

At McClellan AFB ground water probably occurs under the three conditions described above, i.e., confined, unconfined, and perched. The unconfined and perched occurrence are unimportant to water supply but of some significance with regard to pollutant migration. The surface soils and sediments to a depth of approximately 75 feet below land surface (bls) consisting of dense interbedded sand, silt, and clay with lenses of metamorphic channel gravel are part of the Victor Formation described above, in Section 3, Subsurface. This formation is moderately permeable throughout and highly permeable where old stream channels are encountered. Generally, it yields little water except where old channels are present. Some domestic and shallow irrigation wells are completed within this formation [14, 15].

Water supply wells are completed within the deeper strata and generally withdraw water from the Fair Oaks and Mehrten Formations also described above [14]. Wells tapping the Fair Oaks Formation have had reported yields up to 3,500 gpm with a drawdown of approximately 30 feet. The wells at McClellan are generally completed such that they withdraw water from the bottom of the Fair Oaks and top of the Mehrten Formations [19, 20, 21, 22, 23]. Figure 13 illustrates the location of water supply wells at McClellan AFB. The yields reported for wells completed in both the Fair Oaks and Mehrten Formations are generally in the same range as wells completed in the Fair Oaks Formation only [15]. Figures 14 through 19 illustrate geologic logs and construction details of wells at McClellan AFB, Lincoln, and River Dock sites.

Aquifer transmissivity for the water producing portions of the aquifers in the vicinity of McClellan AFB are estimated in the range of 8,700 to 34,800 ft^2/day [24]. Transmissivity is a measure of the ability of the aquifer to transmit water. The storage coefficient within the study area ranges from 0.06 to 0.09 [24]. The storage coefficient is the volume of water a aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head.

The source of water recharging the formations at McClellan AFB is precipitation either directly as rainfall or indirectly as snow melt. There are three methods whereby water falling as precipitation finally enters the aquifer as recharge. One, water flowing in streams from the Sierra Nevada carrying runoff from rainfall and snow melt will percolate through the stream bed into the aquifer. Two, rainfall falling directly on the surface will infiltrate through permeable soils to the aquifer. And three, deep percolation of water supplied for irrigation.

Infiltration through stream channels, particularly the American River is the most significant method of recharge in the McClellan area [14, 15]. The major recharge areas lie adjacent to major streams like the Sacramento and American Rivers as they enter the basin around its margin and through the streambed [14, 15]. In the margin areas, as the stream flows from the rugged Sierra Nevada under a high gradient it is able to carry in suspension fairly coarse materials such as sand and gravel. As the stream enters the flat valley, its gradient and therefore velocity, is reduced significantly.

The stream is no longer able to transport the coarser materials due to the decrease in velocity and deposition of these materials occur. Coarse material is still carried downstream as bedload but much is deposited at the valley margin. The coarse material carried as bedload and that deposited at the valley margins is very permeable and acts as a major conduit to recharge the deeper aquifers. The fact that recharge occurs at the valley margins is illustrated clearly by Figure 10 which depicts a potentiometric high in the vicinity of Folsom, indicating recharge [24]. Figures 11 and 12 illustrate the effects of recharge from the Sacramento River [14, 24].

Only in those areas with sufficiently permeable soil is direct recharge either by irrigation or rainfall an important source of recharge. Soils containing hardpan as at McClellan AFB severely restrict downward movement of water. Clayey soils and clayey strata occurring within the Victor and Fair Oaks Formations also impede direct recharge.

Ground water is discharged from the aquifer system primarily by pumpage. Some water is lost by evapotranspiration and some by discharge to streams, however, loss by pumpage is by far the most significant.

Ground-water quality in the McClellan AFB vicinity is excellent for irrigation and domestic use [14, 15, 16, 24]. The chemical characteristics of this ground water is reflective of its origin, having been derived by recharge from streams draining the crystalline and metamorphic rock areas to the east. Its character is generally calcium, magnesium, and calcium-sodium bicarbonate. In Sacramento County, fresh ground water ranges in thickness from several hundred feet near the eastern portion of the county to an estimated 2,000 feet near the Sacramento River. As illustrated on Figure 9, discussed above, the estimated base of freshwater is approximately 1,400 feet below sea level, therefore, the thickness of freshwater at McClellan AFB is approximately 1,385 feet [14].

McClellan AFB and the offsite installations obtain all of their potable water from wells completed into the Fair Oaks and Mehrten Formations described above. The wells range in depth from 298 to 785 feet and are screened/ gravel pack construction. Table H-2 lists the wells at McClellan AFB as well as construction and operational details. Figures 14 through 19 illustrate well construction details and geologic logs for five of the ten water supply wells at McClellan AFB. Figure 18 and 19 illustrate the same information for the Lincoln and River Dock sites, respectively.

Table H-2
McCLELLAN AFB WATER WELL INFORMATION [16]

Well No.	Well/ Casing Depth (ft)	Pumping Level (ft)	Drawdown (ft)	Pump Rate (gpm)	Known Performance Locations	Year of Construction	Well Casing Diameter (inches)	Type of Casing	(As of April 1979) Water Table Depth (feet)
1	414/400	160	17-18	1,240	162' - 174' 232' - 252' 247' - 252' 266' - 268' 274' - 292' 340' - 354' 376' - 396'	1937	12	Steel	92
2	298/298	152	27-28	510	100' - 112' 141' - 158' 180' - 197' 282' - 296'	1937	12	Steel	93
8	785/625	140	13	1,100	None	1943	10	Steel	90
10	400/400	140	22-24	1,100	170' - 392'	1945	14/10	Steel	83
11	400/400	140	6-9	925	154' - 346'	1945	14/10	Steel	85
12	392/390	140	19-25	1,275	164' - 390'	1943	14	Steel	80
13	400/391	130	11-13	1,100	178' - 300'	1945	14/12	Steel	79
17	353/353	154	21	1,100	216' - 224' 286' - 294' 302' - 312'	1943	14	Steel	88
18	400/400	160	15-18	1,350	169' - 185' 210' - 260' 304' - 349' 378' - 387'	1954	14	Steel	90
20	600/600	104	2	100	178' - 190' 234' - 274' 338' - 374' 494' - 506' 564 - 598'	1954	14	Steel	Not Known
28	247/247	96	Not Known	30	None	1968	8	Steel	Not Known

6. Geologic Aspects of Potential Migration

At McClellan AFB, there are several geologic factors which affect the potential for migration of pollutants offbase.

The base has relatively low relief and therefore runoff rates are also fairly low. This factor affects the infiltration rate causing it to be fairly high. The upper soils are fairly permeable down to the hardpan. The hardpan, a clayey layer is fairly impermeable; however, below the hardpan soils become fairly permeable again. In those areas where the hardpan has been breached, infiltration into the underlying strata is increased. The production zone for water supply wells begins at approximately 100 feet below land surface. The strata occurring above the production zone consist of alternating layers of sand, silt, and clay of varying permeability. In those areas where the upper strata is predominantly sand with some clay and silt the leakage rates to the production zone is increased.

In the vicinity of production wells the drawdown at the pumped well results in the highest head differential between the upper strata (possible source of contamination) and the production zone. The driving force, therefore, between the upper strata and the production zone is highest in the vicinity of the production wells. Two pollutant paths are possible whereby contamination occurring in the upper strata could enter the production zone.

The first is infiltration and leakage through the upper strata into the production zone. This is especially critical where the overlying strata are permeable due to a lack of clay and where the hardpan has been breached. Another contributing factor to this method of pollutant travel is screening of shallow, permeable zones in the production zone. In some of the production wells, perforation begins as shallow as 100 feet (Well No. 2). This upper or first permeable zone is the first strata to be contaminated and may be the only contaminated zone. Wells which tap these shallower zones and occur in areas where contamination potential is high are more likely to be contaminated by surface sources.

The second contamination path is vertical movement of pollutants from a shallow source which has moved horizontally through the upper strata down the annular space between the casings or casing and hole. This is a common source of pollution and is related to past well construction practices whereby no seal or an inadequate seal is provided for.

Pollution of an old abandoned well, No. 7, if improperly plugged could be a continuing conduit from some surfacial source to the production zone.

A third probability for pollution migration is a combination of the two methods listed above. That is, contaminants could infiltrate and leak into the shallowest production zone such as the 100 to 112 foot strata screened in Well No. 2. Once this zone is contaminated pollutants could travel horizontally to Production Well No. 2 or others producing from this strata, and move vertically down the well gravel pack into lower producing zones thus contaminating them also.

Another contributing factor to the movement of pollutants horizontally is increased pumpage for water. The travel time of a particular pollutant once in the production zone is dependent on the permeability of the strata, and the hydraulic gradient. As pumping from a particular area such as the city wells located southwest of the base or irrigation wells located northwest of the base increases, the hydraulic gradient also increase toward the center of pumping. The higher the gradient the less the travel time of a pollutant.

Appendix I

INDUSTRIAL OPERATIONS SUMMARY

Appendix I
INDUSTRIAL OPERATIONS SUMMARY

Building Location	Industrial Activities
7	Power Plant
22	Civil Engineering Paint Shop
26	Service Station
240	Non-Destructive Inspection Lab
243 A	Pneudraulic Repair Shop
243 B	Preventive Maintenance Shop
243 C	Magnetic Penetrant Unit
243 D	Parts Cleaning Unit
243 E	Plastics Shop
243 F	Steam Cleaning Shop, Generator Repair Shop
243 G	Plating Shop
250 M-N	Instrument Repair Shop
251	Instrument Repair Shop
252	Instrument Repair Shop
262 B	Power Plant
310	Special Equipment Repair Center
326	Entomology Unit Storage Area
336	Base Photo Lab
351	Preventive Maintenance Shop
355 A and B	Hydraulic Pump/Motor Repair Shop
355 B	Battery Shop
360	Hydraulic Pump House
362 A	Storage Area
368	Physical Sciences Lab
369	Storage Building

Building Location	Industrial Activities
373	Preventive Maintenance Storage Shed
375	Chemical Storage
378	Chemical Storage
375	F-111 Chemical Deseal and Depaint Washrack
405	General Purpose Repair Shop
411	General Purpose Repair Shop
412	Locomotive Shelter
431	Engine Test Cells
440	Transformer Repair Shop
443	Hydrostatics Test Shop
473	Preventive Maintenance Shop, Paint Shop, and Storage Area
478	Solvent Recovery Stills
611	Electronics Repair Shop Storage Area
615	Oil and Paint Storage
624 C and D	PCB Storage Area
626	Storage Area
628	1155th Central Laboratory
629	1155th Laboratory Storage Area
636	Fire Department Chemical Storage
640	Electronics Repair Shop
655	Radar Van Repair Shop, PCB Storage
656	Service Station
658	Depaint Washrack
666	Hazardous Waste Storage Area

Building Location	Industrial Activities
677	Precision Equipment Measurement Lab
685	Generator Cleaning and Heavy Equipment Shop
692	Aircraft Paint Hangar
694	Paint Storage Area
781	Primary Base Storage Warehouse
786 A	Hazardous Material Storage Area
786 D	Hazardous Cargo Bay
1036	Aircraft Ground Equipment Washrack and Service Area
1086	Hazardous and Radiological Waste Storage Area
1093	Bomb Securing/Direction Unit Cleaning and Repair
1102	U.S. Coast Guard Chemical Storage Area
1106	U.S. Coast Guard Chemical Storage Area
1900	Service Station
Apron 7905	Fuel Test and Fuel Tank Purging
Storage Lot No. 3	DPDO Outside Chemical Storage Lot
Aprons 7807, 7808, and 7620	Flight Preparation Area
Davis Communications Annex	Storage of PCB Transformer Oil, Diesel Fuel, Lube Oil, and Gasoline
Lincoln Communications Annex	Storage of Diesel Fuel, Batteries, and Lube Oil

Appendix J

MCCLELLAN AFB AFLC HAZARDOUS
WASTE SYSTEM EVALUATION

MCCLELLAN AFB

AFLC HAZARDOUS WASTE SYSTEM EVALUATION

AUGUST 1980

2852 ABG/DE

HAZARDOUS WASTE SYSTEM EVALUATION

AUGUST 1980

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

DEMBC CIVIL ENGINEERING PAINT SHOP BLDG #22

1. MATERIALS ENTERING SYSTEM AND SYSTEM SCHEMATIC:

a. Paint stored in Bldg #22 includes 200 gallons of oil base paints, linseed oil, lacquer, water base paints, synthetic thinners, and PD 680 Type II. An average of 50 gallons per week of paints are used throughout the base and an average of 25 gallons per week of paints are used in the spray booth in Bldg 22.

2. WASTE GENERATION AND DESCRIPTION:

a. Any paint left over after each paint job is kept in original container and stored in Bldg 59. The left over paint is used whenever possible. What can't be used is stored as waste in 55 gallon barrels. Paint cleanup waste is stored in the same 55 gallon barrels as paint wastes.

3. WASTE STORAGE AND DISPOSAL:

a. A 55 gallon barrel is filled about once every six months. These barrels of waste have a very low flash point and are considered hazardous. Con-Chen Enterprises, a base refuse collection contractor, moves the barrels from outside storage to hazardous waste storage facility 1086.

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

CIVIL ENGINEERING ENVIRONMENTAL LAB BLDG 334

1. SYSTEM PROCESS AND MATERIALS ENTERING SYSTEM: Laboratory does qualitative and Quantitative analysis of samples submitted. Within the process solvents, some heavy metals (in trace amounts i.e. chromium).

2. WASTE DESCRIPTION: Type, chloroform (solvent) acid and bases; composition, chloroform; quantity, (20 pints/month) 2 gallons acids/bases per month.

3. WASTE STORAGE: Store COD waste solutions containing .04 grams mercuric sulfate/liter.

4. WASTE DISPOSAL: Chloroform used in Phenol analyses and disposed of to sanitary sewage system. Approximately 1 pint per day; however, it is diluted by 1.5 mgd of sanitary sewage.

5. CONTAMINATION POTENTIAL: Chloroform is a suspected carcinogen. No chloroform has yet to be detected in sewage effluent by gas chromatography with a sensitivity of .5 ppb.

6. POTENTIAL FOR WASTE STREAM REDUCTION: Placing chloroform waste into 55 gallon drums for contract waste disposal.

7. POTENTIAL FOR IMPROVEMENT: Would require storing empty drums in area. Reducing waste stream is realistic.

HAZARDOUS WASTE SYSTEM EVALUATION

DEMSB CIVIL ENGINEERING WASTE WATER UNIT BLDG 714

1. SYSTEM PROCESS AND WASTE GENERATED:

a. Part 261.4 of the "EPA Hazardous Waste and Consolidated Permit Regulations" excludes domestic sewage and other wastes passing through a POTW. Therefore, we conclude that our sewage treatment plant effluent and sludge are excluded from hazardous waste regulation.

b. Industrial wastewater discharges are also excluded from hazardous waste regulation. However, industrial waste influent and sludges aren't excluded from regulation. The industrial waste influent averages 500,000 gallons per day. The waste is characterized from the points of generation described in the rest of this hazardous waste inventory. The treatment process begins when influent is collected via an underground pipe system and enters a wet well at the Industrial Waste Treatment Plant (IWTP). The influent goes to an oil separator where sulfuric acid is introduced. Emulsified oil is removed and stored in a tank. The rest of the influent enters two blending basins where it is aerated. Then the influent flows through flow control tube where chemicals, including sulfuric acid, are introduced. The influent then enters a chrome reduction tank where sulfur dioxide is added. The water then enters a neutralization tank where lime and other coagulant aids are added. The water then flows into a heavy metal precipitation tank where liquid alum and polyelectrolytes are added. Sludge is scraped from the bottom of the tank and pumped to a holding tank. The water is then aerated to reduce organic compounds. The overflow is then predominantly pumped to the biological trickling filter. Sometimes a portion of the overflow is returned to the aeration basin or the heavy metals tank. The flow from the biological trickling filter goes into a secondary clarifier. The biological sludge from the clarifier is recirculated to the aeration basin, trickle filters or heavy metals tank. The clarifier wastewater is chlorinated and then enters effluent lagoons. Very soon, the effluent will be diverted to a mixed media filtration system and stored with sewage treatment effluent at the water reclamation ponds. Currently the lagoon wastewater flows into Magpie Creek.

2. WASTE DESCRIPTION:

The IWTP sludge was analyzed by California Analytical Laboratories, Inc. on 10 March 1980. The inorganic sludge composition is as follows: <10mg/kg of chloride; <1mg/kg of boron; <0.2mg/kg of cyanide; 3.0mg/kg of zinc; <0.5mg/kg of cadmium; 0.83 mg/kg of copper; <1mg/kg of lead; 0.14 mg/kg of silver; <0.1mg/kg of mercury; 4.3mg/kg of nickel; 5.5mg/kg of iron; and 8.7mg/kg of chromium. Using the Coulson gas-chromatography technique, California Analytical Laboratories, Inc. found these organic compounds in the IWTP sludge: 150 ppb of 1,1 Dichloroethane; 4300 ppb of chloroform - 1,1,2 Trichloro-2,2,1 Trifluorethane; 8200 ppb of 1,1,1 Trichloroethane; 3100 ppb of Trichloroethylene; 32000 ppb of Tetrachloroethylene, and 150 ppb of chlorobenzene.

3. WASTE DISPOSAL: Sludge scraped from the IWTP heavy metals tank is pumped to a centrifuge where 16% of the weight is removed in the form of a concentrate and returned to the influent pumping station. The dewatered sludge, amounting to 100-130 cubic yards per month, is collected in 4 cubic yard bowsers and disposed in the base landfill.

SM-ALC/MA

HAZARDOUS WASTE SYSTEM EVALUATION

AUGUST 1980

HAZARDOUS WASTE SYSTEM EVALUATION

MAB AIRCRAFT DIVISION

1. SYSTEM PROCESS:

a. Jet engines are placed on stands and tested in five operational test cells at Bldg 431.

b. There are three flight preparation areas (F-106 area at Apron 7807, the F-111 area at Apron 7808 , and the T-39 and A-10 area at Apron 7620)where aircraft systems are checked prior to aircraft take off.

c. There are three material storage/dispensing areas (Bldg 251 outside storage, Bldg 373 chemical storage, and Bldg 694 paint storage area) in support of Aircraft Division functions.

d. There is one fuel test area (Apron 7905) where fuel left in aircraft tanks are quality tested and purged if necessary. Aircraft are also fueled in this area.

e. Engine run-ups are performed at Bldg 632 and 633 to check engine performance.

f. Fuel tank desealing (accomplished by contract) as well as aircraft depainting is done at the Bldg 375 "washrack".

g. Aircraft are painted in Bldg 692.

h. A-10, F106 and F111 aircraft maintenance is done mainly at Bldgs 362, 365, 360, and 251.

i. Jet engine repair is done at Bldg 475F.

j. Aircraft parts and vehicle painting is done at Bldg 655.

k. The tube and cable shop at Bldg 362 uses tetrachloroethylene to degrease and repair cables and tubing.

2. POINTS OF WASTE GENERATION AND WASTE DESCRIPTION:

a. Waste from the jet engine test cells include turbine engine oil MIL-L-7808H, JP4 and PD 680 Type II which is used to clean the engines after testing. Approximately one cup to one quart of engine oil, one gallon of JP4 and one and one-half gallons of PD 680 Type II drips from each engine. All waste materials are collected in drip pans. The total quantity of waste generated is 33-44 gallons per month.

b. Waste from the flight preparation area predominantly are generated from the test stands used to service F111 aircraft. The waste consists of JP4, turbine engine oil MIL-L-7808H and PD 680 Type II which are collected in drip pans. The total quantity of waste generated is 12-20 gallons per month.

c. There is no waste from the Bldg 378 and Bldg 251 storage areas. Outdated paints stored in Bldg 694 are sent to the MA Physical Science Laboratory for testing. Unuseable paint is turned in to DPDO for disposal.

d. Fuel test area personnel purge fuel tanks containing JP4 with either Soltrol 200 (when its available) or a 90% JP5/10% 1010 oil mixture. Approximately 8000 gallons of this mixture accumulates per month.

e. The engine run-up areas have negligible amounts of waste engine oil MIL-L-7808H, hydraulic fluid MIL-H-5606, JP4 and PD 680 Tyep II unless there is a spill incident.

f. Building 375 washrack:

(1) The contractor-operated F111 fuel tank deseal program is almost completed (3-6 aircraft are scheduled for desealing next fiscal year). The desealer, El Dorado SR 51, consisting of thiophenol, pyrrolidone, triethyl phosphate and naptha, is replenished and reused four times before the contractor barrels the contaminated desealer. The fuel tank cleaner, El Dorado 500 alkaline cleaner consisting of ethylene glycol monobutyl ether, monophenol polyethylene glycol, sodium doecyl benzene sulfonate and distilled water, is also reused until no longer useable. Then the contractor barrels the contaminated cleaner. Each aircraft's fuel tanks are then rinsed with approximately 3000 gallons of water which is flushed into the industrial waste drain.

(2) The aircraft washrack depaint area generates approximately 25,000 gallons per month of phenolic wastewater, 3000 gallons per month of other paint strippers and cleaning compounds plus an unknown quantity of rinse water and paint residues, EPA Hazardous Waste No. F017. A detailed description of the industrial drain wastewater is as follows:

(a) Inland AP 599 polyurethane paint stripper, consisting of dichloromethane, ethyl alcohol and ammonia.

(b) Turco 5873 paint stripper, consisting of methylene chloride, methyl alcohol, sodium chromate and ammonia.

(c) MIL-R-25134B paint stripper (nonphenolic)

(d) PR 3500 phenolic paint stripper, limited to three 55 gallon drums per day of use.

(e) Turco 5351 paint stripper, consisting of methylene chloride, phenol and sodium chromate.

(f) Freon TF, consisting of trichlorotrifluoroethane

(g) MIL-C-25769G alkaline cleaner

(h) Turco 555H

(i) GD 500 cleaning compound, consisting of ethylene glycol monobutyl ether, monyl phenol polyethylene glycol and sodium dodecyl benzene sulfonate

(j) Acetone

(k) Methyl ethyl ketone

g. Hazardous waste generated at the Bldg 692 paint hanger consists of lacquers, solvents and coatings, EPA Hazardous Waste No. F017. These accumulate at the rate of 10-15 55-gallon drums per month. Presumably all of these materials become part of the waste stream requiring disposal. The materials/hazardous constituents used in the paint hanger include:

(1) Lacquer MIL-L-81352 consisting of lead chromate.

(2) Polyurethane enamel aliphatic MIL-C-83286B consisting of methyl ethyl ketone, ethyl acetate, ethylene glycol mono ethyl ether acetate, hexamethyl (aliphatic) diisocyanate.

(3) Acetone O-A-51F

(4) Epoxy Primer MIL-P-23377 consisting of toluene, cellosolve, N-Butyl alcohol, isopropyl alcohol.

(5) Gray lacquer TT-L-32A consisting of isobutyl alcohol, isobutyl acetate, methyl ethyl ketone, methyl isobutyl ketone, ethyl benzene, isopropyl alcohol.

(6) Clear lacquer TT-L-32 consisting of cyclohexanone, isobutyl alcohol, isopropyl alcohol, ethyl acetate, ethyl benzene, cellosolve acetate.

(7) Blue enamel TT-E-489E consisting of mineral spirits.

(8) Gray polyurethane paint MIL-C-83286B consisting of methyl ethyl ketone, ethylene glycol, hexamethyl (aliphatic) diisocyanate.

(9) Semi gloss enamel TT-E-485 consisting of lead oxide, solvents

(10) Acrylic resin MIL-L-81352 consisting of ketones, esters, alcohols

(11) Denatured alcohol O-E-00760C consisting of methyl alcohol, ethyl alcohol.

(12) Methanol, methyl alcohol O-M-232F consisting of methyl alcohol

(13) Enamel primer TT-P-664 consisting of zinc chromate, iron oxide, toluol butanol

(14) Rain erosion coating MIL-C-83731 consisting of alcohol, xylene, cellosolve acetate

(15) Astrocoat thinner MIL-C-83231 consisting of xylene.

(16) Acrylic lacquer MIL-L-19537C consisting of methyl ethyl ketone, N-butyl acetate, toluol cellosolve acetate, butanol.

(17) Coating, polyurethane MIL-C-83286B consisting of aliphatic isocyanate (HMDI), methyl ethyl ketone, N-butyl acetate, cellosolve, acetate, toluene, xylene

(18) Enamel TT-E-527C consisting of toluene, titanium dioxide

(19) Enamel MIL-E-46096 consisting of Toluene, titanium dioxide

(20) Linseed oil TT-L-190D

(21) Thinner, paint TT-T-291E consisting of stoddard solvent

(22) Thinner, aliphatic MIL-T-81772 consisting of methyl ethyl ketone, butyl acetate normal, cellosolve acetate, toluene, xylene

(23) Walkway costing MIL-W-5044C, consisting of lead naphtha, aliphatic alkyd resin.

(24) Enamel TT-E-508C consisting of titanium dioxide,alkyd resin, naphtha,mineral spirits,calcium and cobalt driers.

(25) Corrosion remover MIL-C-38334A consisting of fluoride phosphoric acid

(26) Cleaning compound MIL-C-25769H consisting of ammonia butyl cellosolve

(27) Methyl ethyl ketone TT-M-261D consisting of methyl ethyl ketone

(28) Thinner (mineral spirits) TT-T291E consisting of turpentine, ethyl benzene

(29) Enamel TT-E-01793 consisting of toluene, titanium dioxide

(30) Enamel TT-E-509 consisting of mineral spirits, calcium cobalt

(31) Corrosion remover MIL-C-10578C consisting of phosphoric acid, butyl cellosolve

(32) Lacquer, white TT-L-54C consisting of methyl isobutyl ketone, methyl ethyl ketone

(33) Paint and varnish remover TT-R-251H consisting of methanol, methylene chloride

(34) Enamel, green TT-E-529 consisting of mineral spirits

(35) Naphtha, aromatic TT-N-97C consisting of aromatic naptha.

(36) Coating, polyurethane RD2621-44 consisting of aliphatic diisocyanate

(37) Enamel, olive drab MIL-E-46096C consisting of lead chromate, lead molybdate, VMP naptha,isobutyl acetate, butanol

(38) Alodine MIL-C-55418 consisting of ferrocyanide salts, acidic chromates, fluorides

(39) Coating, clear TT-C-00542E consisting of toluene diisocyanate, aromatic hydrocarbons, aliphatic hydrocarbons, ethyl acetate

(40) Primer coating, zinc TT-P-1757 consisting of chromate, VMP naphthate normal, toluene, N-butanol, isopropyl alcohol

(41) Wash primer MIL-E-8514 consisting of zinc chromate, phosphoric acid,

(41 cont) polyvinyl butanol resin, N-butanol alcohol, ethyl alcohol

(42) Epoxy, polyamide, coating MIL-C-22750C consisting of methyl-N-amyl ketone, xylene, N-butyl acetate, mono ethyl ether, N-butyl alcohol ethylene glycol.

(43) Enamel,alkyd MIL-E-52798A consisting of lead chromate, lead molybdate, cobalt oxide, cobalt titanate, chromium oxide, mineral spirits.

h. Small amounts of aircraft drippings are collected in drip pans in the aircraft maintenance areas. The drippings consist of hydraulic fluid MIL-H-5606 and MIL-H-83282, turbine engine oil MIL-L-7808H, and PD 680 Type II. The total waste for all aircraft maintenance areas is approximately 82 gallons per month. In addition, F111 aircraft and A10 aircraft hydraulic systems are being drained of MIL-H-5606 and replaced with a nonflammable and less expensive ($4per gallon) hydraulic fluid, MIL-H-83282. Last year 9,000 gallons of the discarded hydraulic oil from F111 aircraft were barreled and turned into DPDO for sale . This year approximately 4,200 gallons of hydraulic fluid will be drained from A10 aircraft, barreled and turned into DPDO for sale.

i. The engine shop generates 25 gallons per month of contaminated JP4 and hydraulic fluid MIL-H-5606.

j. The aircraft parts and vehicle painting shop uses many of the same materials as the paint hanger (see the paint shop list). There is one large spray paint area with four waterfall booths and one conveyor painting operation. This shop generates approximately six 55-gallon drums per month of waste paint residues and solvents, EPA Hazardous Waste No. F017.

k. The tube and cable shop uses tetrachloroethylene for degreasing tubes and cables. Approximately 20-40 gallons per month of contaminated tetrachloroethylene becomes waste, EPA Hazardous Waste No. F001. The 200 gallon degreasing tank is replenished and then the tank is purged once every six to eight months. This is a guess because this operating procedure is so new, the tank hasn't yet been purged. The waste is put in 55 gallon barrels.

3. WASTE STORAGE AND DISPOSAL:

a. Waste from the jet engine test cells is flushed down the industrial waste drain.

b. Flight preparation areas:

(1) The waste from the F106 flight prep area is collected in either five gallon buckets and disposed in a 1300 gallon bowser or the waste is drained into a 500 gallon wheeled bowser. The 1300 gallon bowser is emptied by Civil Engineering into the Facility 346 A-B oil skimmer/storage tank. The 500 gallon bowser is emptied into the Apron 7905 underground tank (15,000 gallon capacity). Our DPDO has a contract with IT Corporation to pump the waste out of both storage facilities tanks into a tanker truck. The Apron 7905 waste is then hauled to a reprocesser who filters the waste and sells it as a heating fuel. The facility 346 A-B waste probably is used for road oiling.

(2) The waste from the F111 flight prep area is emptied into a 1000 gallon bowser. The bowser is then emptied by Civil Engineering into the Facility 346 A-B oil skimmer/storage tank. Excess waste is emptied into a 500 gallon wheeled bowser and dumped into the Apron 7905 underground tank.

(3) The waste from the taxiway 7620 support area is collected in 5 gallon buckets and disposed in the nearest Civil Engineering bowser.

c. The unuseable materials from the material storage areas are turned in to DPDO on DD Form 1348-1.

d. Used JP4, contaminated Soltrol 200 and JP5 are stored in a 15,000 gallon underground tank at Apron 7905. IT Corporation, the waste oil contractor, pumps out the tank into a tanker truck and turns the waste over to another company which filters the mixture. The filtered mixture is then sold as a supplement to heating fuel.

e. All waste is flushed down the industrial waste drain at the engine test cells.

f. All waste is flushed down the industrial waste drain at the Bldg 375 wash rack except for contractor-generated waste which is barreled.

g. Mixed paint waste and paint cleaning waste from the Bldg 692 paint hanger is put into new DOT 17E drums, marked and labeled. DEEX arranges for drum transportation to our hazardous waste storage at Facility 1086. The drums are transported by Con Chen Enterprises, a refuse collection contractor.

h. Aircraft maintenance shops until recently stored wastes in bowsers. They now store their wastes in 55 gallon size drums. Drums will be turned in to DPDO when a DD Form 1348-1 is filled out. MADT transports the drums to DPDO's storage area at Bldg 700. Each waste is segregated and containerized according to T.O. 42B-1-23.

i. The jet engine repair shop also is starting to put their waste oils and solvents in drums instead of using a bowser. The same storage and disposal procedures will be used as in 3.h.

j. Paint residues and solvents are being stored in 55 gallon DOT 17E drums. DEEX takes storage and disposal action on this waste. The waste is transported and stored in the same way as 3.g.

k. Waste tetrachloroethylene used in the tube and cable shop is pumped from the solvent tank into 55 gallon drums. The DPDO will accept accountability for the material when turn-in documents are properly prepared.

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

MAC, PENUDRAULIC REPAIR SHOP BLDG #243A, PUMP/MOTOR REPAIR SHOP BLDG #355, AND INSTRUMENT REPAIR SHOP BLDG #251

1. SYSTEM PROCESS:

a. The Pneudraulic Repair Shop consists of hydraulic components, cleaning, repair, and test operations using standard hydraulic shop test stands and tools.

b. The Instrument Repair Shop operates a paint and cleaning facility on the southwest side of Bldg 252, and 250 M-N.

c. The Hydraulic Pump/Motor Repair Shop consists of hydraulic pump/motor overhaul shop, a degreaser, and a paint spray booth, and a solvent spray booth.

2. MATERIALS ENTERING SYSTEM AND WASTE GENERATED:

a. PD 680 Type II Solvent; 300 gallons are purchased in 55 gallon drums with the Pneudraulic Repair Shop producing 170 gallons of waste and the Motor Repair Shop producing 50 gallons of waste per month.

b. Hydraulic fluid 6083; 1750 gallons are on hand for parts cleaning and spray booths for the Pneudraulic Repair and the Hydraulic Repair Shop with a waste product of about 360 gallons per month.

c. 1,1,1Trichlorethane MIL-T-81533A: All three shops use this for cleaning with a usage of 500 gallons per month and a waste product of 270 gallons.

3. WASTE STORAGE AND DISPOSAL:

a. All waste hydraulic fluid and Type II solvent is collected at the west end of Bldg 243A in 55 gallon drums and arrangements made for delivery by MA Transportation to DPDO with some Type II solvents sent to distilling operation for reuse by waste generator.

b. Trichlorethane is stored in 55 gallon barrels at Bldg 243A; 1000 gallon bowsers at Bldg 252 and 250M all for pick up by Civil Engineering and delivered to DPDO for resale.

HAZARDOUS WASTE SYSTEM EVALUATION
PLANT MANAGEMENT DIVISION (MAD)

1. SYSTEM PROCESS:

a. Preventive Maintenance Branch (MADP), Bldg 351, operates a solvent spray booth and a tank degreaser.

b. Preventive Maintenance Paint Shop (MADID), Bldg 473C, operates a paint spray booth for parts, equipment and barrel painting.

2. MATERIALS ENTERING SYSTEM AND DESCRIPTION OF WASTE GENERATED:

a. MADP degreases parts in the solvent spray booth. The dirty solvent (tetrachloroethylene) is transferred to a holding tank, filtered and returned to the solvent spray booth. Dirty solvent which can no longer be filtered and reused is pumped into 55 gallon drums at the rate of 40 gallons per month. MADP also degreases parts in a tank degreaser. The dirty solvent (tetrachloroethylene) is pumped into 55 gallon drums at the rate of one drum per month.

b. MADID, Bldg 473C stores 60 gallons of synthetic resin enamel thinner TT-T-306C, consisting of a maximum of 8% aromatic compounds, 20% ethylbenzene and toluene, or a maximum of 20% of any of these materials; 200 gallons thinner: dope and lacquer TT-T-266D (cellulose nitrate) consisting of butyl acetate (TT-B-838), isobutyl acetate (TT-I-710), isobutyl alcohol (TT-I-730), methyl ethyl ketone (TT-M-261), isopropyl alcohol (TT-I-735), naptha-aliphatic (TT-N-95), and toluene, technical (TT-T-548); aliphatic polyurethane coating thinner Mil T-81772 consisting of 29-31% methyl ethyl ketone, 9-11% butyl acetate, 39-41% cellosolve acetate, 12% toluene and 8% xylene; 600 gallons latex paint; and 200 gallons of oil base paint. Waste paints and thinners are generated at the rate of 100 gallons per month.

3. WASTE STORAGE AND DISPOSAL:

a. Used tetrachloroethylene is stored in 55 gallon drums and transported to an on-base hazardous waste storage area.

b. Waste paints and thinners are stored in 55 gallon drums and transported to an on-base hazardous waste storage area.

HAZARDOUS WASTE SYSTEM EVALUATION

MAI: ELECTRONICS REPAIR SHOP BLDG 640, BOMB SCORING/DIRECTING SECTION BLDG 1093

1. SYSTEM PROCESS AND MATERIALS ENTERING SYSTEM:

a. Electronics Repair Shop Bldg 640: Solvent spray booth and soap cleaning operations for parts cleaning. Approximately 700 gallons of Calla 301, a cleaning compound, and 300 gallons of cleaning solvent PD 680 Type II are kept on hand.

b. Electronics Repair Shop Bldg 640: Paint and spray booth operation for equipment painting. Approximately 300 gallons of paint and 300 gallons of lacouer thinner TT-T-266D are stored in Bldg PB 188 and Bldg 611.

c. Bomb Scoring Direction Section Bldg 1093: Parts cleaning area. Freon 602-T WD, 100 gallons mixed with Calla 301 cleaning compound; 50 gallons of cellulose nitrate dope; 5 gallons of paint and lacquer remover; and 5 gallons of trichloroethane are stored at Bldg 1093.

d. Electronics Repair Shop Bldg 640: Miscellaneous oils and lubricants; 600 gallons of hydraulic fluid; gear box oil; turbine engine oil Mil-L-7808H; transformer oil (mineral); and greases are kept on hand.

2. WASTE GENERATION STORAGE AND DISPOSAL:

a. The solvent spray booth cleaning operation at Bldg 640 produces a consolidated waste product of 55 gallons per month which is pumped to a 500 gallon underground tank on the west side of Bldg 640. The waste is pumped into a bowser when the tank is full and transported by Civil Engineering to the Facility 346A-B oil skimmer/storage tank.

b. The soap cleaning booth in Bldg 640 produces 10,000 gallons per month of waste Calla 301, a cleaning compound, and waste water. The waste is drained into a tank which is pumped out by Civil Engineering and taken to the industrial waste treatment plant.

c. The paint and spray booth operation at Bldg 640 produces a waste product consisting of 110 gallons of paint residues, PD 680 Type II and lacquer thinners. Nonvolatile materials including waste from the paint booth waterfall and dry paint waste are stored in a floor sump. Periodically MAI personnel pump out the sump and dispose of the waste in a washrack south of Bldg 640. The wash rack is hooked up to the industrial waste drain system. Volatile materials including paint residues, F017 EPA Hazardous Waste Number, are stored in a 500 gallon underground tank located on the south side of Bldg 640. When the tank is full, MAIPG calls Civil Engineering to pump out the tank and transport the waste to the industrial waste treatment plant. There are approximately 170 gallons per month of volatile and nonvolatile painting operation wastes.

d. Bomb Scoring/Directing Section Bldg 1093: Approximately 165 gallons of degreaser sludge is produced every month and 165 gallons of paint residue with solvents. Both are drained into a 1,000 gallon underground tank. The tank is pumped out by Civil Engineering and is transported to the industrial waste treatment plant, Bldg 714.

e. Electronics Repair Shop Bldg 640: Approximately 25 gallons per month of waste oils are stored in a 1,000 gallon bowser for pickup by Civil Engineering. The waste is disposed at the Facility 346A-B oil skimmer/storage tank.

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

(MAN) INDUSTRIAL PRODUCTS AND ELECTRICAL COMPONENTS DIVISION

Listing by unit giving process, materials entering system/points of waste generation, waste description (type, composition, monthly quantity), and method of disposal. The EPA hazardous waste no. is preceeded by an asterisk (*).

1. Bonded Panel Unit (MANPAH) Bldg 243F:

a. Vapor degreasing operation, using Freon Type TF (*F002), generating a waste of 20 gallons a month, disposal by DPDO.

2. Plastics Unit (MANPAF) Bldg 243E:

a. Depainting radome operation; using Turco Type 5875, paint remover and residue *F001 , containing methylene chloride and ammonium hydroxide; generating a waste of 20 gallons per month, disposal to hazardous waste storage area facility 1086.

3. Plating Shop (MANPE) Bldg 243G and Bldg 666:

a. Vapor degreasing operation using O-T-634 tetrachloroethylene, *F001 a waste of 632 gallons per month, waste containerized in 55 gallon barrels and disposed of by DPDO.

b. Chromium plating solution process; creating a chromic metal acid sludge *F006, at a concentration of 30 to 40 ounces per gallon, a waste of 166 gallons per month, containerized in 55 gallon barrels and picked up for disposal to DPDO.

c. Cadmium stripping solution process, using cadmium and ammonium nitrate sludge *F006 at a concentration of 4 to 5 ounces per gallon, a waste of 83 gallons per month, the waste enters industrial drain which goes to industrial waste treatment plant.

d. Electroless nickel plating solution process, proprietory product, as received concentration *F006, a waste of 200 gallons per month. Waste is containerized in 55 gallon barrels and picked up for disposal to the hazardous waste storage area.

e. Nickel (electroless) stripping solution process, proprietory product of unknown quantity of nickel, a waste of 1500 gallons per month The waste enters the industrial drain which goes to industrial waste treatment plant. Solution depletes in two weeks.

f. Chemical milling solution, aluminum process; proprietory product, alkaline (Turco) with an unknown quantity of aluminum *D002, a waste of 960 gallons per month The waste enters industrial drain which goes to the industrial waste treatment plant.

g. Zincate solution for aluminum process, using zinc oxide producing a caustic aluminum sludge, generating a waste of 250 gallons. The waste enters the industrial waste drain which goes to the industrial waste treatment plant.

h. Alkaline rust remover process, using MIL-C-14460 material producing a steel sludge with a concentration of 16 to 48 ounces per gallon, at a total waste product of 180 gallons per month. The waste enters the industrial waste drain which goes to the industrial waste treatment plant.

i. Silver cyanide plating solution process, using silver cyanide *F007, with a concentration of 16 ounces per gallon. The total waste generated is 38 gallons per month, containerized in 55 gallon barrels for disposal by DPDO.

j. Alkaline cleaning solution process, using sodium triphosphate ($Na_3\ PO_4$: 10 ounces per gallon) and sodium hydroxide (NaOH: 3 ounces per gallon), producing a metal sludge waste produce of 1000 gallons per month. Waste enters the industrial drain which goes to the industrial waste treatment plant.

k. Caustic cleaning solutions process, uses sodium hydroxide (NaOH: 5 to 10 ounces per gallon) and sodium carbonate ($NaCO_3$: 9 to 20 ounces per gallon), with a waste of 330 gallons produced per month. Waste enters industrial drain which goes to the industrial treatment plant.

l. Phosphorous anodizing solution process, uses phosphoric acid (H_3PO_4: 10% solution) producing an aluminum sludge, a waste of 250 gallons per month is produced, waste enters industrial drain and goes to the industrial waste treatment plant.

m. Acid pickle process, uses nitric acid (HNO_3: 30% solution) producing an aluminum sludge and HCL acid (HCl: 30% solution) producing a metal sludge, a waste of 130 gallons per month results, with the waste entering industrial drain which goes to the industrial waste treatment plant.

n. Dye and sealer for aluminum process; uses acetic acid (CH_3COOH: .25 oz per gallon) dye, nickel acetate producing an aluminum sludge, a waste product of 40 gallons per month, waste enters industrial drain which goes to industrial waste treatment plant.

o. Silver stripping process, uses sodium cyanide (NaCN: 10 to 14 ounces per gallon) and sodium carbonate (NaOH: 1.3 ounces per gallon) produces a silver sludge *F009, a waste of 100 gallons per month is produced, pick up and delivery to DPDO for disposal.

p. Phosphate coating process, uses phosphoric acid and zinc manganate *D002 which is a proprietory product, with a waste of 275 gallons per month. Waste enters industrial drain which goes to industrial waste treatment plant.

q. Chemical conversion coating process; uses chromate, chromic acid, ferrocyanide (MIL-C-81706 material) *F007 at a concentration of 2.5 ounces per gallon, a waste of 220 gallons is produced. Waste enters industrial drain and goes to industrial waste treatment plant.

r. Chrome pickle for magnesium process, uses chromic acid (CrO_3: 24 to 30 ounces per gallon) sulfuric acid (H_2SO_4: .25 ounces per gallon) producing a magnesium sludge *D003. A waste of 14 gallons per month is produced, pick up of 55 gallon barrels is transferred to hazardous storage area facility 1086.

s. Oakite 34M chemical milling line process, uses chromic acid (24 ounces per gallon) *D002 a base proprietory product, a waste of 55 gallons per month. Waste enters industrial drain and goes to industrial waste treatment plant.

t. Oakite SA stripping compound (organic) process for stripping adhesive epoxy, proprietory product may contain chlorinated solvent *F002. A waste of 31 gallons a month generated. Pick up and delivery in 55 gallon barrels to hazardous waste storage area facility 1086.

u. Chromate deoxidizer process, using sodium chromate ($Na_2Cr_2O_72H_2O$:4.1 to 12.0 ounces per gallon) and sulfuric acid (H_2SO_4:38 to 41 ounces per gallon) *D002, a waste of 220 gallons per month is generated. Waste is picked up for delivery to hazardous waste storage area facility 1086.

v. Isoprep 44 non-etching alkaline cleaning process, a proprietory product. A waste of 660 gallons is generated, enters the industrial drain which goes to the industrial waste treatment plant.

w. Chrome anodize process, using chromic acid (4 to 13 ounces per gallon) *D002. A waste of 55 gallons per month is generated, picked up for delivery to hazardous waste storage area facility 1086.

x. Sulfuric anodize and hard anodize process, using sulfuric acid (H_2SO_4: 20 ounces per gallon) and carbonic acid (H_2C_2O:2 ounces per gallon) *D002, a waste of 30 gallons per month is generated, waste enters the industrial drain which goes to the industrial waste treatment plant.

4. Manufacture Section (MANPBA, MANPBE) Bldg 243B:

a. Machining and grinding operation; uses Five-Star 40 water soluble (diluted 30 to 1) coolant, a proprietory product and barrels honing oil, a proprietory product, a waste of 705 gallons per month is generated. Waste is collected in 55 gallon barrels for pick up and disposition by DPDO.

5. Bearing Unit (MANPEB) Bldg 440:

a. Carbon removal of bearings process, uses a proprietory product containing alkaline and chlorinated materials *F001. A waste of 20 gallons per month is generated. Waste is collected in 55 gallon barrels for pick up and disposition by DPDO.

b. Vapor degreasing operation; using O-T-634 tetrachlorethylene *F001 producing a waste of used solvent and sludge, 75 gallons per month. Waste is collected in 55 gallon barrels for pick up and disposal by DPDO.

c. Solvent cleaning operation, using P-D-680 Type II dry cleaning solvent, with a waste of used solvent and oil, 165 gallons, recycled by vacuum distillation for reuse.

6. Cleaning and Corrosion Unit (MANPJE) Bldg 243D:

a. Depainting operation, using MIL-R-83936 hot stripper, a proprietory product containing amines and alkaline materials producing a waste of paint sludge, 300 gallons per month. Waste is collected in 55 gallon barrels for pick up and delivery to hazardous waste storage area facility 1086.

b. Pretreating aluminum process; using MIL-C-81706 chromate conversion coating containing chromate, chromic acid, ferrocyanide, and nitric acid *F006, a waste of 45 gallons per month is generated, Waste is collected in 55 gallon barrels for pick up and delivery to hazardous waste storage area facility 1086.

c. Pretreating magnesium process, using spec O-H-795 hydrofluoric acid (HF: 10 to 20% by weight) *F006, with a waste product of magnesium sludge, 45 gallons per month. The waste is collected in 55 gallon barrels for pick up and delivery to hazardous waste storage area facility 1086.

d. Metal parts cleaning operation, using MIL-C-25769 alkaline cleaner, a proprietory product dilutes 1 to 5. A waste of 90 gallons generated per month. Waste enters industrial drain which goes to industrial waste treatment plant.

e. Dichromate (DOW 7) magnesium treatment process, MIL-M-3171 sodium dichloromate (16 to 24% by weight). A waste of 62 gallons per month is generated. It is collected in 55 gallon barrels for pick up and delivery to hazardous storage area facility 1086.

f. Paint shop operation; uses lacquer,polyurethane,epoxy paint, and thinners producing a waste of used paints and thinners combined, 73 gallons per month, collected in 55 gallon barrels for pick up and delivery to hazardous waste storage facility 1086.

g. Vapor degreasing operation, using tetrachloroethylene producing a used solvent and sludge, 220 gallons per month, collected in 55 gallon barrels for pick up and delivery to DPDO for disposition.

7. NDI/Magnetic/Penetrant Unit (MANPJB) Bldg 243D:

a. Base "C" oil process, uses kerosene, with a waste of 30 gallons per month, collected in 55 gallon barrels for pick up and delivery to DPDO for disposition.

8. Screw Actuator/Landing Gear Unit (MANPMA) Bldg 351:

a. A/C components cleaning operation, using dry cleaning solvent producing a waste of solvent, hydraulic fluid and Freon TF, 55 gallons per month. Collected in 55 gallon barrels for pick up and delivery to DPDO for disposition.

9. Oil Cooled Generator Repair Unit (MANPPG) Bldg 243F:

a. Generator cleaning solution process, uses oleic soap (ammonium hydroxide, oleic acid, and acetone) producing a waste of 1000 gallons per month. Enters industrial drain which goes to industrial waste treatment plant.

b. Generator cleaning solvent process, uses dichlormethane with a waste of 10 gallons per month. Collected in 55 gallon barrels, and delivered to DPDO for disposition.

c. Hydraulics and light turbine lube operation, uses MIL-L-7808 and MIL-L-17672 lube oil, A waste of 50 gallons is generated in 55 gallon barrels for pick up and delivery to DPDO for disposition.

d. Hydraulics operation, using MIL-L-5606 hydraulic fluid, with a waste of 10 gallons per month. Collected in 55 gallon barrels for pick up and delivery to DPDO for disposition.

10. Physical Sciences Lab Branch (MANC) Bldg 368 and Bldg 243G:

a. Process material sample waste product, uses solvent and process solutions-from MANCB, a waste of 5 gallons per month. Waste goes to dumpster for burial.

b. Oil sample, used MIL-L-7808 oil from SOAP program with a waste of 5 gallons per month, stored for disposal by DPDO.

c. Hydraulic fluid sample, used hydraulic oil, with a waste of 15 gallons per month waste goes dumpster for burial.

d. Excess chemicals of no value or past shelf life; trichlorotriflouroethane (5 1-gallon cans) *F002; toluene (1 gallon) *U220, Toluene Diisocyanate (5 gallons) *U223; Trichloroethylene (5 gallons) *U228; cyclohexanone (2 gallons)*U057; Acetone (5 gallons) *U002; ethylene dichloride (10 gallons)*F002; xylene (10 gallons) *U239; Freon TF and methylene chloride(5 gallons) *F002; Tetrachloroethylene (5 gallons) *U210; methylene chloride (5 gallons) *F001; Turco 5873, containing epoxy paint remover; methylene chloride, formic acid, cresylic acid (4 gallons) *D002, Toluene Lacquer (5 gallons) *D001.

COMMENTS: DPDO disposition - stored near Bldg 700 for possible resale, if that is not accomplished a contractor is used for pick up and disposal from DPDO.

Hazardous waste storage area facility 1086 is used for storage until arrangement for contract disposal to chemical landfill, or as recommended by regulation.

AFCC/2049 COMM GP

HAZARDOUS WASTE SYSTEM EVALUATION

AUGUST 1980

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

2049CG/LGMX POWER PLANT BLDG # 262B

1. Same as Bldg #7.

2. MATERIALS ENTERING SYSTEM:

   a. Diesel Fuel; 20,000 gallon capacity underground tank.

   b. Four 750 gallon day tanks for intermediate diesel fuel.

   c. 250 gallon lube oil tank.

3. WASTE GENERATION AND DESCRIPTION:

   a. Day tank skimming accomplished once a week at an average of one-half gallon of water condensation and diesel fuel which is transferred to waste oil tank.

   b. Lube oil change accomplished once a year on four engines at 90 gallons each with dirty lube oil taken to waste oil tank.

4. WASTE STORAGE AND DISPOSAL:

   a. One, 250 gallon capacity waste oil tank is emptied by DEMSB as required about once a year which in turn, is sent to DPDO for resale.

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

2049CG/LGMX POWER PLANT BLDG #7

1. SYSTEM PROCESS: Power Plant is for emergency power production.

a. Diesel fuel is pumped from underground tank to day tank, day tank to engine. Fuel is consumed except for water condensation drained off once a week going to waste oil tank.

b. Lube oil tank used in engine operation. Oil is added or changed as required. Changed oil goes to waste oil tank.

2. MATERIALS ENTERING SYSTEM:

a. Diesel fuel 55,500 gallon capacity underground tank.

b. 575 gallon capacity day tank for immediate diesel fuel usage.

c. 250 gallon capacity lube oil tank.

3. WASTE GENERATION AND DESCRIPTION:

a. Day tank skimming accomplished once a week at an average of one-half gallon of diesel fuel and water condensation which is transferred to waste oil tank.

b. Lube oil change is accomplished once every nine months producing about 100 gallons of dirty lube oil which is transferred to waste oil tank.

4. WASTE STORAGE AND DISPOSAL:

a. One, 500 gallon capacity waste oil tank is emptied by DEMSB as required about once every three years which in turn, is sent to DPDO for resale.

2852 ABG/TP

HAZARDOUS WASTE SYSTEM EVALUATION

AUGUST 1980

HAZARDOUS SUBSTANCE SYSTEM EVALUATION

TP TRANSPORTATION OPERATION

1. SYSTEM PROCESS:

a. Special equipment repair center, Bldg 210 is responsible for on site repair of automotive equipment using cleaning solvents and automotive maintenance products.

b. General purpose vehicle repair center Bldg 411 is responsible for on site repair of automotive equipment using cleaning solvents, automotive maintenance products and vehicle painting operation.

c. Fuel tanker servicing area at the rear of Bldg 655 is responsible for repair and maintenance of fuel tanker trucks.

2. MATERIALS ENTERING SYSTEM AND WASTE GENERATED:

a. Bldg 310 has about 800 gallons of petroleum base oils (engine oil, hydraulic brake fluid, hydraulic oil and anti-freeze) stored in Bldg 310 and storage shed on south end of 310, with a waste product of about 200 gallons.

b. Bldg 310 has about 80 gallons of Stoddard Solvent on hand stored in Bldg 310. The cleaning operation produces a waste product of about 55 gallons a month

c. Bldg 411 has about 410 gallons of gear and engine oil on hand stored in 55 gallon drums producing a waste of about 80 gallons of dirty oil a month.

d. Bldg 411 has about 550 gallons of hydraulic oil and break fluid stored in 55 gallon barrels producing a waste product of about 55 gallons a month.

e. Bldg 411 has a paint-depaint operation with about 200 gallons of paint and 450 gallons of thinners on hand.

f. Bldg 411 has 500 gallons of transmission oil on hand with about 15 gallons of waste.

g. Bldg 411 has 200 gallons of anti-freeze with small amounts of waste.

h. Bldg 655 has about 1900 gallons of JP4 and Avgas.115/145 fuel on hand with about 10 gallons of waste per month.

i. Bldg 655 has about 400 gallons of engine oil on hand with about 25 gallons of dirty oil produced per month.

3. WASTE STORAGE AND DISPOSAL:

a. Bldg 310, petroleum base oil waste is stored in a 750 gallon bowser emptied by Civil Engineering once every four to six months and sent to DPDO for resale.

b. Bldg 310, spent Stoddard Solvent is placed in 55 gallon barrels and sent monthly to distilling area for reuse.

c. Bldg 411, dirty gear and engine oil is placed in 1000 gallon holding tank and delivered by Civil Engineering to DPDO for resale.

d. Bldg 411, dirty hydraulic oil and brake fluid is placed in 55 gallon barrels and transported by user to DPDO for resale.

e. Bldg 411, paint residue and thinners are transferred as produced to bowser at Bldg 655.

f. Bldg 411, dirty transmission oil is transferred by user in 55 gallon barrels to DPDO once every six months.

g. Bldg 411, small amounts of anti-freeze are washed down the industrial drain, then to industrial treatment plant.

h. Bldg 655, small amounts of fuel are washed down the industrial drain, then to industrial treatment plant. Other contaminated fuel is pumped into a fuel tanker truck and disposed at the Facility 346A-B oil skimmer/storage tank.

i. Bldg 655, dirty oil is stored in 1300 gallon bowser and shared with Smith Engineering, an AGE operations and maintenance contractor. Civil Engineering empties the bowser at the Facility 346A-B oil skimmer/storage tank.

AFSC/1155 TECH OPS SQ

HAZARDOUS WASTE SYSTEM EVALUATION

AUGUST 1980

HAZARDOUS WASTE SYSTEM EVALUATION

1155 TECHNICAL OPERATIONS SQUADRON

1. SYSTEM PROCESS:

a. The Central Laboratory (MCL) Bldg 628 performs a wide range of laboratory analyses, gas analyses, applied physics-related analyses and radiation analyses.

b. The Maintenance Section (LGM) Bldg 626D maintains and does minor repair of equipment.

2. MATERIALS ENTERING SYSTEM AND DESCRIPTION OF WASTE GENERATED:

a. Materials used in support of the Central Laboratory are specified in our spill plan by stock number, amount on hand and nomenclature. Identifiable hazardous substances, with EPA Hazardous Waste Numbers, include:

(1) Methyl ethyl ketone, U159
(2) O-xylene, U239
(3) Phenol, red, U188
(4) Carbon tetrachloride, U211
(5) Benzene, high purity, U019
(6) Trichloroethylene, U228
(7) Ethyl acetate, U112
(8) Methyl iso butyl ketone, U161
(9) Heavy metals including molybdenum, lanthinides, lead and nickel.

There are .21 gal per month of waste carbon tetrachloride. Heavy metal analyses contain, on the average, 50 mg of heavy metals per sample. Except for diethyl ether, which has a three month shelf life, most chemicals don't have a shelf life and are completely used in the analyses.

b. The Maintenance Section has small amounts of waste ultrasonic cleaners and alodining solution containing chromic acid. Quantity hasn't been determined. Also, there are approximately 10 gallons of waste lubricating oil per month and five gallons of waste dichloromethane per month.

3. WASTE STORAGE AND DISPOSAL:

a. Ether is incinerated with bunsen burners. The fumes are exhausted through a vapor hood and water scrubber system. The wastewater is transported to the industrial waste drain. All other acids and bases as well as carbon tetrachloride used in analyses are poured into the industrial waste drain. All chemical bottles are rinsed and put into a metal-glass dumpster for disposal at the Sacramento County landfill.

b. The Maintenance Section's petroleum wastes are put into 55 gallon drums and transported to the Facility 346 A-B oil skimmer/storage tank.

HAZARDOUS WASTE SYSTEM EVALUATION

1155 TECHNICAL OPERATIONS SQUADRON

1. SYSTEM PROCESS:

a. The Central Laboratory (MCL) Bldg 628 performs a wide range of laboratory analyses, gas analyses, applied physics-related analyses and radiation analyses.

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3. WASTE STORAGE AND DISPOSAL:

a. Ether is incinerated with bunsen burners. The fumes are exhausted through a vapor hood and water scrubber system. The wastewater is transported to the industrial waste drain. All other acids and bases as well as carbon tetrachloride used in analyses are poured into the industrial waste drain. All chemical bottles are rinsed and put into a metal-glass dumpster for disposal at the Sacramento County landfill.

b. The Maintenance Section's petroleum wastes are put into 55 gallon drums and transported to the Facility 346 A-B oil skimmer/storage tank.

Appendix K

PESTICIDES AND HERBICIDES
USED AT McCLELLAN AFB

Appendix K
PESTICIDES AND HERBICIDES USED AT McCLELLAN AFB

1. <u>Insecticides</u>

   Diazionon 4E 47.5% Conc. Emulsion

   Diazinon 0.5% Oil Solution

   Malathion 57% Conc. Emulsion

   Malathion 95% Tech Grade (ULV)

   Baygon 1.0% Oil Solution

   Sevin W/P 75%

   Chlordane 72% Conc. Emulsion

   Diazinon 2% Granuals

   Pyrethrin 3% Fog Solution (ULV)

   Meta-Systox-R Tree Injectors

   Pyrenone Fog Concentrate

   Pyrethrin 0.6% Aerosol, 12 oz can

2. <u>Rodenticides</u>

   Diphacinone 0.005% Bait Block

   Diphacin 110 Concentrate

   Warfarin 0.025% Bait

   Zinc Phosphide (1 oz bottle)[1]

   Styrchnine Alkaloid[1]

3. <u>Other</u>

   Pidgeon 9 (Strychnine treated grain)[1]

   Avitrol bird control

4. <u>Herbicides</u>

   Bromacil (Hyvar X)

   Atrazine 80% W.P.

   Simazine 80% W.P.

   Amitrol T

   Dalapon 85% W.P.

   Diquat (Aquatic weed control)

   Trexsan (24D-Dicamba-MCPP)

5. <u>Fungicides</u>

   Kromad

   Calachlor

   Actidone

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[1]Restricted pesticides.

Table K-1
CURRENT WEED AND VEGETATION CONTROL PRACTICES AT MCCLELLAN AFB

Purpose	Areas	Frequency	Herbicides
Soil Sterilization	Around buildings, railroads, tank farms, ammunition areas, fence lines, storage lots, antenna sites, and roadsides. (~400 acres)	Once yearly	Atrazine and Hyvar X
Selective Weed Control (post emergence)	Golf course, athletic fields, and turfed areas	Once yearly (May)	Trexsan (240 Dicamba MCPP)
Aquatic Weeds and Algae Control	Lakes and ditches on base, sites, and golf course. (~40 acres)	At least twice yearly	Diquat
Pre-Emergence Weed Control	Turfed areas on base, golf course, and shrub beds. (~100 acres)	Once yearly (golf areas twice yearly)	Decthan Beta-San
Soil Sterilization in Hard to Reach Places (inaccessible for sprayers)	Antenna farms on base and off. (~50 acres)	Once a year (October)	Atratal 8-P granular herbicide (Atrazine, Sodium Chlorate, Sodium Metabarate)
Fungus Control	Tees and greens of golf course (~4 acres)	Twice monthly (from February through November)	Kromad, Cal Chlar, or Actidone

Appendix L

SANITARY WASTEWATER TREATMENT

Appendix L
SANITARY WASTEWATER TREATMENT

1. Main Base Treatment

McClellan AFB has a segregated wastewater collection system consisting of approximately 100,000 feet of gravity sewer, ranging from 6 to 21 inches in diameter; three major lift stations; and 10,600 feet of forcemain ranging from 6 to 10 inches in diameter. Construction dates range from 1937 to 1974 with major rehabilitation in 1972.

The Sanitary Wastewater Treatment Plant (SWTP), Facility 333, is located in the southeastern part of the base. The plant was built in 1942 and later expanded in 1944. Design hydraulic capacity is 2.0 mgd, however, the present average flow is approximately 1.5 mgd.

The SWTP treats wastewater generated by office buildings, housing areas, and lavatories in the industrial areas onbase.

The SWTP is a two-stage biological treatment facility employing the following major processes:

a. Primary clarification
b. Primary trickling filtration (1st stage)
c. Secondary clarification
d. Secondary trickling filtration (2nd stage)
e. Final clarification
f. Disinfection
g. Digestion
h. Sludge dewatering

Primary clarification removes the gross solids present in the raw wastewater received at the plant.

Clarified wastewater is then treated through two stages of trickling filters and additional clarifiers to reduce the organic constituents and solids in the wastewater.

Effluent from the final clarification step is then disinfected through chlorine addition in a chlorine contact basin.

Final treated and disinfected wastewater is discharged to Magpie Creek; however, in July 1981, treated wastewater will be reclaimed and used onbase for irrigation of green areas, for cooling towers, and various industrial processes on base. Treated effluent values are indicative of acceptable water quality and are within the limitations imposed by the current NPDES permit.

Wastewater sludge is stabilized through a two-stage anaerobic digestion process followed by dewatering on sludge drying beds. The dewatered sludge is used on-base as a soil supplement with the excess sludge disposed of in the base landfill.

In addition to the SWTP, five septic tanks are in service at more remote areas of the base. Septic tank locations are:

Building No.	Description
713	Gun Club
720	Sanitary Latrine
773	General Purpose Aircraft Shop
1082	Electric Shop
1099	Power Plant

2. Capehart Family Housing Annex

Sanitary wastewater is collected and pumped to a county operated wastewater treatment facility. The collection system was constructed in 1960.

3. Camp Kohler Annex

Camp Kohler served as the base laundry from the early 1950's to 1973. The laundry was a major operation and handled up to 9 million articles of clothing a year.

Wastewater from the laundry operation, boiler blow-down, and spent ion exchange softener regenerant were collected and transported through a concrete lint settling basin prior to gravity discharge to a county wastewater treatment plant located near the southeast property boundary. Discharge from the treatment plant was to Magpie Creek. Lint from the settling basin was periodically collected and hauled offsite for disposal by personnel from McClellan AFB.

The laundry operations ceased in 1973 and currently, the only occupant at Camp Kohler is the 1155th Technical Operations Squadron which operates a laboratory in Building 4000 in the northeast portion of the property. Sanitary wastewater from Building 4000 is discharged to the county treatment plant which is still in operation. Laboratory chemical wastes and solvents are containerized and transported to McClellan AFB for proper disposal.

4. Davis Communications Annex

The Davis Communications Annex was built in the 1950's and was originally a communications training center. The facility was designed to house a staff of 150 people, however, the present population is about 12 people, none of which live at the site.

The wastewater treatment facility treats strictly sanitary wastewater. Original waste disposal was by means of a septic tank and underground leach fields. Area soils are largely composed of clay which contributed to intermittent leach field failure over the years. Present wastewater treatment facilities consist of a septic tank and three evaporation ponds, each measuring 80 feet x 30 feet x 3 feet deep.

5. <u>Lincoln Communications Annex</u>

The Lincoln site is serviced by a septic tank with underground leach fields. Overflow from the septic tank is collected in an evaporation/percolation pond. The pond is approximately 75 feet x 100 feet and 3 to 4 feet deep.

The present population at the site is 3 to 7 persons. No industrial operations are conducted at the site, therefore, the waste is strictly domestic in nature.

6. <u>McClellan Storage Annex</u>

Sanitary wastewater from the McClellan Storage Annex is discharged to the Aerojet wastewater treatment plant. A small sanitary wastewater treatment plant owned by McClellan Storage Annex is no longer in use.

Appendix M

INDUSTRIAL WASTEWATER TREATMENT

Appendix M
INDUSTRIAL WASTEWATER TREATMENT

The industrial wastewater collection system orginally consisted of five separate collection systems, some dating back to 1942. In 1970, the separate systems were combined into one complete system which was subsequently enlarged in 1974 to increase hydraulic capacity by 100 percent. Infiltration/ inflow into the system is low and the system is considered to be in good condition.

The industrial wastewater treatment plant (IWTP), Facility 714, is located in the west central part of the base. The plant was constructed in two phases, beginning in 1971 and completed in 1974. Design hydraulic capacity is 1.2 mgd, however, the present average flow is approximately 0.5 mgd.

The treatment plant consists of various processes to treat a variety of industrial wastewater streams generated at the base. Treatment processes include:

1. Gravity oil separation
2. Equalization/storage
3. Chemical treatment
    a. Chromium reduction
    b. pH adjustment
    c. Heavy metals precipitation
4. Aeration
5. Trickling filtration
6. Clarification
7. Phenol removal
8. Disinfection
9. Effluent polishing

Industrial wastewater received at the plant is first pumped to an oil-water separator where sulfuric acid is added to optimize the separation process. Separated oil is stored and later sold.

After oil separation the water is stored in one of two equalization basins, while wastewater in the other basin is undergoing additional treatment.

Subsequent to equalization/storage, the wastewater is subjected to 3 stages of chemical treatment, the first is addition of sulfuric acid and sulfur dioxide to reduce hexavalent chromium to trivalent chromium. In the next stage, the pH is increased to prepare the wastewater for heavy metals precipitation, the third stage. Lime and coagulant aid are used to increase the pH and precipitate the heavy metals.

Following chemical treatment, the wastewater is aerated in two basins. Aeration serves to reduce phenolic and other organic compounds as well as strip out some volatile organic compounds.

A trickling filter following the aeration basins provides additional reduction of phenolic and organic compounds.

Effluent from the trickling filter is then clarified to remove solids prior to discharge to two aerobic lagoons.

The lagoons provide some additional reduction of organics as well as providing extra storage prior to final discharge into Magpie Creek.

An additional treatment step, multimedia filtration, is planned for installation in July 1981, to comply with plans for recycling and reuse of wastewater. This will result in a reduction of discharges to surface waters.

Prior to treatment at the IWTP, some wastewater sources undergo pretreatment.

At the new plating shop in Building 243G, the wastewater is treated prior to its discharge to the IWTP. Processes include:

1. Cyanide oxidation
2. Neutralization
3. Chromium reduction

The second plating shop, located in the 368 area, operated from 1945 to 1959 and provided municipal pretreatment.

The third plating shop, located in Building 666, started pretreatment in 1959. The facility provided pretreatment including:

1. Cyanide oxidation
2. Chromium reduction
3. Heavy metals precipitation

Discharge from the plating shop goes to the IWTP.

The aircraft components washrack facility located in Building 475 provided pretreatment with the discharge going to the sanitary wastewater treatment plant. Operating dates for the pretreatment system are unknown and pretreatment has since ceased and the wastewater is now divered to the IWTP.

The wastewater received at the IWTP is relatively weak organically but is high in phenols and the heavy metal, chromium.

Treated effluent values are indicative of acceptable water quality; compliance with the limitations imposed by the current NPDES permit is greater than 99 percent.

Waste industrial sludge was, until recently, disposed of onbase in various sludge pits and burial pits. Currently, all waste industrial sludge is sent off-base to a State-approved chemical landfill.

Appendix N

ARCADE WATER DISTRICT REPORT ON WATER QUALITY DEGRADATION IN WELL NO. 31

ARCADE WATER DISTRICT
E. WALT LIBAL
P.O. BOX 214317
SACRAMENTO, CA 95821
916 483-2953

May 4, 1981

Norm Hatch
CH_2M Hill
P.O. Box 1647
Gainesville, Fla 32602

Dear Mr. Hatch:

Enclosed is the information you requested re: water quality deterioration in the District's North Highlands Service Area. The material is self-explanatory but, feel free to contact me for any additional information or clarification of any point.

Very truly yours,

E. Walt Libal

E. Walt Libal
General Manager

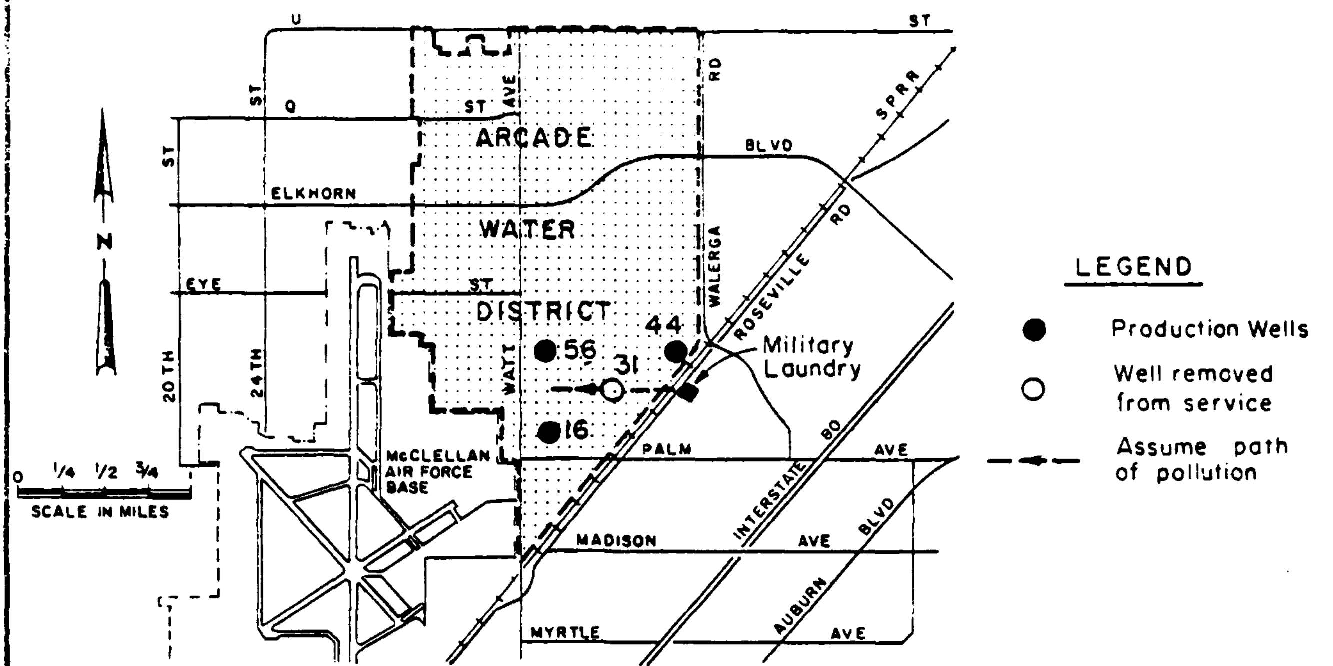
Degraded Water Area

It was noted in about 1960 that the water quality from Well #31 in the North Highlands area was deteriorating. The supply from this well was therefore monitored using hardness, chlorides, and total solids as parameters. The water quality continued to deteriorate as shown in Figure 6-4 and the well was taken out of service in 1979.

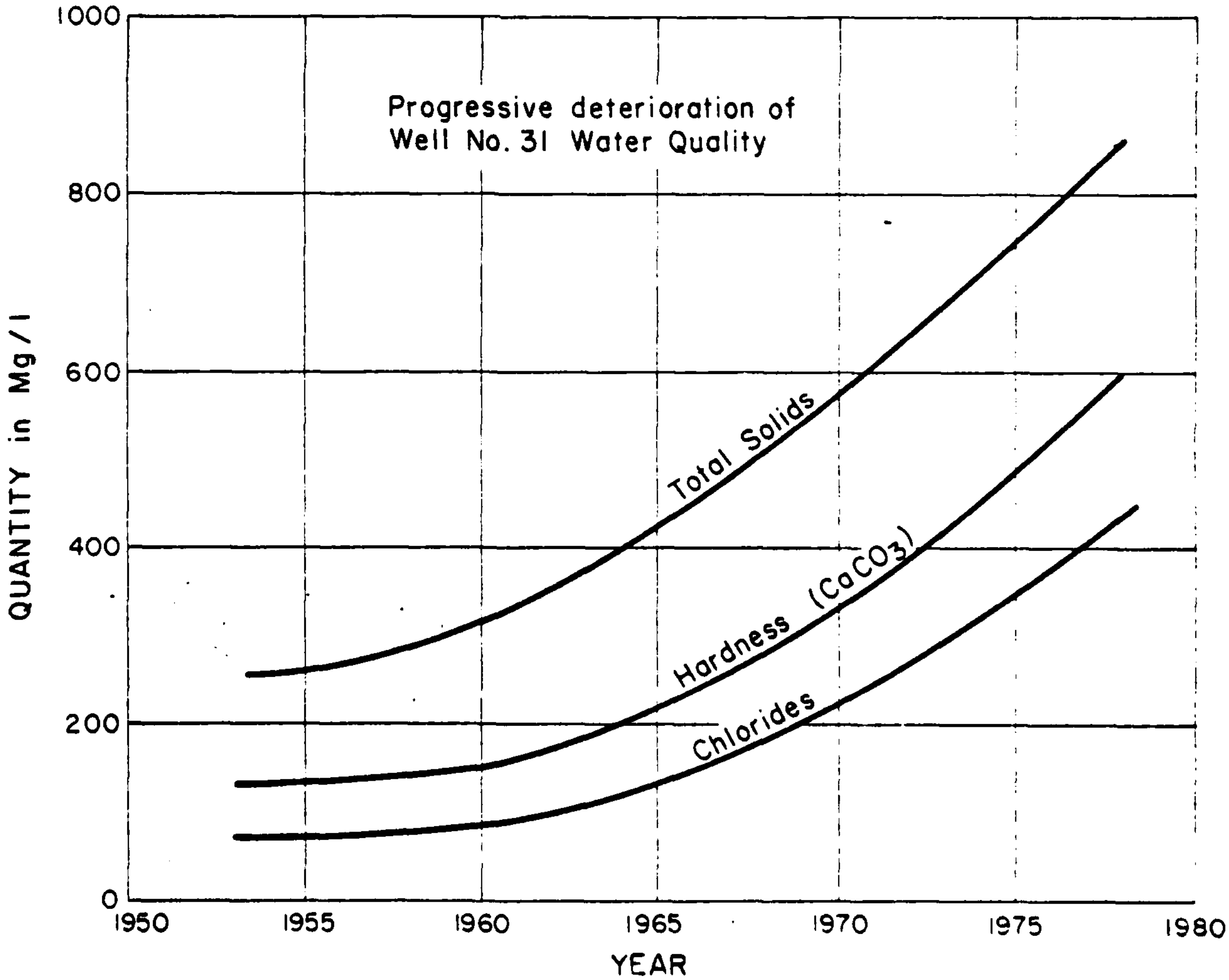
The well was televised and the various perforated strata were individually pumped using an assembly with packers above and below the pump. All the strata within the 415 foot depth of the well were found to be degraded. While televising the well, water could be observed moving from the upper perforations downward in the well. This was no doubt due to differential pressures in the well strata resulting from the draft on the well field.

Cause of the degraded water has not been determined. However, a large military laundry was operated from around 1942 to 1973 about 2000 feet to the east of the well. It is understood that the laundry had zeolite softeners. Means of disposing of the wastewater from regeneration of the softeners are unknown. Such wastes would, of course, contain calcium, chlorides, and solids.

Wells No. 16, 44 and 56, located in the vicinity have been also monitored and have not shown any deterioration in water quality. It would appear that the path of pollution may be to the west, which is the direction of the groundwater movement in the area. Continued monitoring of the wells in the degraded water area is necessary.



VICINITY MAP



QUADRUPLICATE
RETAIN THIS COPY

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

Do Not Fill In
No 16179

State Well No.____
Other Well No.____

STATE OF CALIFORNIA

5

MISSION RANCHO

(1) OWNER:

Name [illegible] Water Company.
Address 2642 El Paseo Lane
Sacramento, California

(2) LOCATION OF WELL: Mission Rancho Unit#2

County Sacramento Owner's number, if any—
R. F. D. or Street No. Section 37 Rancho Del Paso
65 ft. North of Hidalgo Way
90 ft. East of Rio Verdi Way
150 ft. West of San Vincente Way
200 ft. South of Karl Drive

(3) TYPE OF WORK (check):

New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:

SINGLE ☒ DOUBLE ☒

From ft.	to ft.	Diam.	Gage or Wall
Single			
0	50	18	3/16
Double			
0	300	14	10 R.S.

If gravel packed

Diameter of Bore	from ft.	to ft.

Type and size of shoe or well ring
Size of gravel:
Describe joint

(7) PERFORATIONS:

Type of perforator used Mills
Size of perforations 2 in., length, by 1/2 in.

From ft.	to ft.	Perf. per row	Rows per ft.
203	215	9	1
225	229	9	1
260	270	9	1
293	300	9	1

(8) CONSTRUCTION:

Was a surface sanitary seal provided? ☒ Yes ☐ No To what depth 50 ft.
Were any strata sealed against pollution? ☒ Yes ☐ No If yes, note depth of strata
From 0 ft. to 50 ft.
Method of Sealing Cement Grout Between 14 & 18 inch Casing

(9) WATER LEVELS:

Depth at which water was first found 35 ft.
Standing level before perforating 74 ft.
Standing level after perforating 74 ft.

(10) WELL TESTS:

Was a pump test made? ☒ Yes ☐ No If yes, by whom? W. L. Kirchgater
Yield: 1200 gal./min. with 300 ft. drawdown after 24 hrs.
Temperature of water 69 Was a chemical analysis made? ☐ Yes ☒ No
Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG:

Total depth 415 ft. Depth of completed well 415
Formation: Describe by color, character, size of material, and structure.

ft.	to ft.	Formation
0	1	Soil
1	25	Hard Pan
25	27	Sand
27	46	Sandy Clay
46	55	White Hard Clay
55	92	Sandy Clay - First Water
92	126	White Sticky Clay
126	129	Brown Fine Sand
129	132	Hard White Clay
132	135	Sandy Clay
135	170	Hard Brown Clay mixed Gravel
170	205	Hard Br. Clay & Gravel & Sand
205	217 S	Sand & Small Gravel - [illegible]
217	226	Brown Hard Clay
226	231	Sand - 5
231	262	Hard Gray Clay & Small Gravel
262	274	Cement Sand
274	295	Hard Brown Clay & Gravel
295	308	Course Sand & Small Gravel
308	312	Sandy Clay
312	371	Hard Shaley Clay
371	375	Fine Brown Sand
375	394	Hard Brown Clay very Hard
394	408	Hard White Lava
408	412	Sand & Gravel 8
412	415	Dark Gray Clay

Work started 12/1 1954 Completed 1/22 1955

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Walter L. Kirchgater
(Person, firm, or corporation) (Typed or printed)
Address 3992 14th Avenue
Sacramento, California

[SIGNED] Walter L. Kirchgater
Well Driller

License No. 140263 C 57 Dated January 20, 1955

98888 3-54 50M QUIN 3 SPO

DWR FORM NO 246 (REV [illegible])

AD-A124 153 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR MCCLELLAN AIR FORCE BASE CALIFORNIA(U) CH2M HILL GAINESVILLE FL JUL 81 F08637-80-G-0010 4/5

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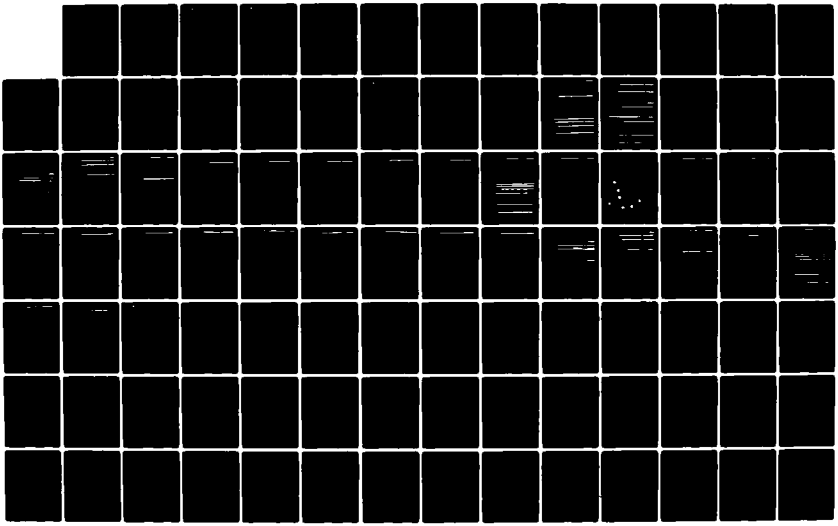

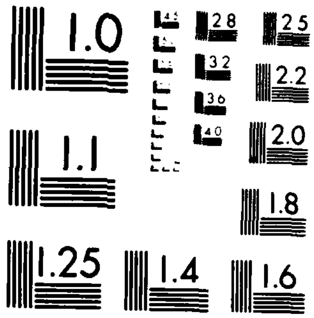

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

MISSION RANCHO #31

Pump - BJ

Motor -

Horse Power - 75

Date Drilled - January 1955

Tank - 5,000 GALLON

G PM -

AIR LINE ~~[illegible]~~' ~~136~~' 177'

Well Depth - ~~415'~~ 357' (4-10-72)

Well Size - 14"

Perforations - 2" x 1/2"

203'	to 215'
225	229
260	270
293	308

Bowls - 3KL 4 STAGE

Setting - ~~[illegible]~~' 177'

Column - 8" x 1 7/16" x 2 1/2"

Standing Level - 74'

Casing - 50' - 18" - Grouted
388' - 14" - drhs
27' - Open bottom

Water Temperature - 69

Driller - Walter Kirchgater

0	feet to 1 foot	- Soil
1	foot to 25 feet	- Hardpan
25	feet to 27 feet	- Sand
27	46	Sandy Clay
46	85	White Hard Clay
85	92	Sandy Clay - First Water
92	116	White sticky clay
116	119	Brown fine sand
119	122	Hard White Clay
122	135	Sandy Clay Clay mixed Granite
135	170	Hard Brown Clay mixed Granite
170	205	Hard Brown Clay & Gravel
205	217	Sand and Small Gravel
217	226	Brown hard clay
226	231	Sand
231	262	Hard Gray Clay & Small Gravel
262	274	Cement sand
274	295	Hard Brown Clay & Gravel
295	308	Coarse sand and small gravel
308	312	Sandy Clay
312	371	Hard shaley clay
371	375	Fine Brown Sand
375	394	Hard Brown Clay - Very hard
394	408	Hard White Lava
408	412	Sand and Gravel
412	415	Dark Gray Clay

Appendix O

NPDES PERMITS

Appendix O
NPDES PERMITS

The California Regional Water Quality Control Board on November 9, 1953, adopted Resolution No. 53-59 and on December 14, 1961, adopted Resolution No. 61-149, which prescribed requirements for a discharge from McClellan AFB industrial and domestic wastewater treatment facilities to Magpie Creek tributary to the Natomas East Main Drainage Canal and the Sacramento River.

From January 10, 1975 to November 27, 1978, the discharge from McClellan AFB was governed by an NPDES Permit issued by the Environmental Protection Agency (EPA).

Presently, McClellan AFB discharges are controlled by a State NPDES Permit No. CA0004359, which became effective November 27, 1978. Details of the current permit are attached.

After July 1, 1981, the discharge to surface waters from McClellan domestic and industrial wastewater treatment plants is prohibited. Industrial waste will receive mixed media filtration to reduce suspended solids while domestic waste will receive high lime and/or alum treatment to remove phosphorus and reduce silica. Both streams will be chlorinated for disinfection and reused onbase for cooling water make-up, irrigation, and other non-potable base uses.

The State permit, which now controls discharges from McClellan AFB, will expire November 27, 1983.

Waste discharges from the Davis site were originally controlled under Resolution Order No. 64-104, prescribing requirements for a discharge from the Davis site to two stabilization ponds in series. On January 23, 1981, Resolution Order

No. 81-015 was enacted in order to more accurately prescribe requirements for the containment of any discharge from the Davis site.

An additional pond was constructed in order to prevent waste discharges from the site was well as increase evaporative/percolative losses. A detailed description of Resolution Order No. 81-015 is attached.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 78-232

NPDES NO. CA0004359

WASTE DISCHARGE REQUIREMENTS
FOR
McCLELLAN AIR FORCE BASE
DOMESTIC AND INDUSTRIAL WASTEWATER TREATMENT PLANTS
SACRAMENTO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board), finds that:

1. McClellan Air Force Base (hereinafter discharger) has applied for waste discharge requirements and a permit to discharge waste under the National Pollution Discharge Elimination System.

2. McClellan Air Force Base discharges 2.0 mgd (87.6 l/sec) of treated domestic waste and 1.2 mgd (52.6 l/sec) of treated industrial waste into Magpie Creek and the Natomas East Main Drainage Canal, a water of the United States, at a point 2,000 feet (610 m) east of Raley Boulevard and 2,000 feet (610 m) north of Bell Avenue in Del Paso Heights, North Sacramento. Treated sewage sludge is used on base as a soil amendment.

3. The report of waste discharge describes the existing discharge as follows:

   a. Discharge 001: Domestic Wastewater Treatment Plant Effluent

      Average Flow: 1.0 million gallons per day (MGD) (44 l/sec)

      Design Flow: 2.0 million gallons per day (MGD) (87.6 l/sec)

Constituents	Milligrams per liter	lbs/day	kg/day
BOD	12	61	28
Suspended Matter	7	34	16

   b. Discharge 002: Industrial Wastewater Treatment Plant Effluent

      Average Flow: 0.5 million gallons per day (MGD) (22 l/sec)

      Design Flow: 1.2 million gallons per day (MGD) (52.6 l/sec)

      Influent Flow: Varies from day to day and is treated in a batch process

Constituents	Milligrams per liter	lbs/day	kg/day
COD	110	340	154
Suspended Solids	18	61	28

c. Discharge 003: Effluent from 30" (0.8 m) storm drain outfall approximately 200' (61 m) northwest of Building 431. This discharge originally contained fuel spills from an engine test cell that has since been eliminated. A discharge continues to occur and the Air Force has been unable to trace its source, but believe it is primarily cooling water.

d. Discharge 004: Effluent from 24" (0.6 m) storm drain outfall on the west side of the intersection of X street and 47th Street. This discharge originally contained fuel spills from an engine test cell that has since been eliminated. A discharge continues to occur and the Air Force has been unable to trace its source, but believes it is primarily cooling water.

e. Discharge 005: Arcade Drainage Effluent

f. Discharge 006: Second Creek Effluent

g. Discharge 007: Magpie Creek at west boundary of Base, approximately 400' (122 m) west of Building 704. Combination of all Base discharges including off base discharges, but not Discharges 005 & 006, just prior to leaving Base property.

4. EPA and the Regional Board have classified this discharge as a major discharge.

5. The Board on 25 July 1975 adopted a Water Quality Control Plan for the Sacramento-San Joaquin Delta Basin. The Basin Plan contains water quality objectives for the Sacramento River and its tributaries.

6. The beneficial uses of Magpie Creek and the Natomas East Main Drainage Canal are: municipal and agricultural supply; recreation; esthetic enjoyment; and the preservation and enhancement of fish, wildlife, and other aquatic resources.

7. The beneficial uses of the groundwater are: domestic, industrial, and agricultural supply.

8. Effluent limitation, and toxic pretreatment effluent standards established pursuant to Sections 208b, 301, 302, 303, 304, and 307 of the Federal Water Pollution Control Act and amendments thereto are applicable to the discharge.

9. The discharge from McClellan Air Force Base is presently governed by a NPDES permit issued by the Environmental Protection Agency on 10 January 1975.

10. The Board on 14 December 1961 adopted Resolution No. 61-149 and on 9 November 1953 adopted Resolution No. 53-59 which prescribed, respectively, requirements for a discharge from McClellan Air Force Base industrial and domestic wastewater facilities to Magpie Creek tributary to the Natomas East Main Drainage Canal and the Sacramento River.

11. McClellan Air Force Base proposes to discharge 2.0 MGD (87.6 l/sec) of treated domestic waste and 1.2 MGD (52.6 l/sec) of treated industrial waste to tertiary treatment facilities prior to storage and distribution. Industrial waste will receive mixed media filtration to reduce suspended solids while domestic waste will receive high-lime and/or alum treatment to remove phosphorus and reduce silica. Both streams will be chlorinated for disinfection and reused on base for cooling water make-up, irrigation, and other non-potable base uses.

12. The action to adopt a NPDES permit is exempt from the provisions of the California Environmental Quality Act in accordance with Section 13389 of the Water Code and Sections 15101, 15102, 15103, and 15104 of the Administrative Cod

13. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

14. The Board in a public meeting heard and considered all comments pertaining to the discharge.

15. This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Water Pollution Control Act, or amendments thereto, and shall take effect ten days from the date of hearing provided the Regional Administrator EPA has no objections.

IT IS HEREBY ORDERED, McClellan Air Force Base, Department of the Air Force, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and the provisions of the Federal Water Pollution Control Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. After 1 July 1981, the discharge of waste to surface water drainage courses from Discharge 001 or 002 is prohibited.

2. The bypass or overflow of untreated or partially treated waste is prohibited from Discharge 001 or 002 and Discharge 003 and 004 during dry weather conditions commencing 1 July 1979.

3. The discharge of reclaimed wastewater in the form of aerosols to areas of human habitation is prohibited.

B. Effluent Limitations: Discharge 001-007

1. The discharge of an effluent in excess of the following limits is prohibited prior to 1 July 1981:

WASTE DISCHARGE REQUIREMENTS
McCLELLAN AIR FORCE BASE, DOMESTIC
AND INDUSTRIAL WASTEWATER TREATMENT PLANT
SACRAMENTO COUNTY

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a. Discharge 001: Domestic Wastewater Treatment Plant Effluent

Constituent	Units	30-Day Average	7-Day Average	30-Day Median	Daily Maximum
BOD(1)	mg/l	30	45	- -	90
	lbs/day*	500	750	- -	1500
	kg/day*	230	340	- -	680
Total Suspended Matter	mg/l	30	45	- -	90
	lbs/day*	500	750	- -	1500
	kg/day*	230	340	- -	680
Settleable Matter	ml/l	0.1	- -	- -	0.2
Total Coliform Organisms	No./100 ml	- -	- -	23	500

(1) 5-Day, 20°C Biochemical Oxygen Demand
*Based upon a design treatment capacity of 2.0 MGD (87.6 l/sec)

b. Discharge 002: Industrial Wastewater Treatment Plant Effluent

Constituent	Units	30-Day Average	Daily Maximum
Suspended Solids	mg/l	30	60
	lbs/day*	300	600
	kg/day*	140	270
Settleable Solids	mg/l	0.1	0.2
Total Copper	mg/l	0.5	1.0
	lbs/day*	5.0	10
	kg/day*	2.3	4.5
Total Nickel	mg/l	0.5	1.0
	lbs/day*	5.0	10
	kg/day*	2.3	4.5
Total Zinc	mg/l	0.5	1.0
	lbs/day*	5.0	10
	kg/day*	2.3	4.5
Total Chromium	mg/l	0.5	1.0
	lbs/day*	5.0	10
	kg/day*	2.3	4.5
Hexavalent Chromium	mg/l	0.05	0.10
	lbs/day*	0.5	1.0
	kg/day	0.23	0.45
Total Cyanide	mg/l	0.5	1.0
	lbs/day*	5.0	10
	kg/day*	2.3	4.5

*Based on a design treatment capacity of 1.2 MGD (52.6 l/sec)

WASTE DISCHARGE REQUIREMENTS
McCLELLAN AIR FORCE BASE, DOMESTIC
AND INDUSTRIAL WASTEWATER TREATMENT PLANTS
SACRAMENTO COUNTY

Constituent	Units	30-Day Average	Daily Maximum
Amenable Cyanide(1)	mg/l	0.05	0.10
	lbs/day*	0.5	1.0
	kg/day*	0.23	0.45
Total Silver	mg/l	0.05	0.10
	lbs/day*	0.5	1.0
	kg/day*	0.23	0.45
Total Lead	mg/l	0.05	0.10
	lbs/day*	0.5	1.0
	kd/day*	0.23	0.45
Total Cadmium	mg/l	0.10	0.20
	lbs/day*	1.0	2.0
	kg/day*	0.45	0.91
Phenol	mg/l	0.10	0.20
	lbs/day*	1.0	2.0
	kg/day*	0.45	0.91
Oil & Grease	mg/l	10	15
	lbs/day*	100	150
	kg/day*	45	68

(1) Those cyanides amenable to chlorination as described in 1972 Annual Book of ASTM Standards, 1972, Standard D2036-72 Method B, Page 553.

*Based on a design treatment capacity of 1.2 MGD (52.6 l/sec)

2. The discharge of an effluent in excess of the following limits is prohibited:

a. Discharge 003, 004 & 005:

Constituent	Unit	Daily Maximum
Oil & Grease	mg/l	5.0
MBAS	mg/l	0.5
COD	mg/l	60

b. Discharge 006:

Constituent	Units	Daily Maximum
Oil & Grease	mg/l	5.0
MBAS	mg/l	0.5

c. Discharge 007:

Constituent	Unit	Daily Maximum
Oil & Grease	mg/l	5.0(1)
MBAS	mg/l	0.5(2)

(1) Or, shall not cause an increase of more than 5.0 mg/l in receiving waters

(2) Or, shall not cause an increase of more than 0.5 mg/l in receiving waters

3. The arithmetic mean biochemical oxygen demand (5-day) and suspended solids in effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same time during the same period (85 percent removal). (Discharge 001).

4. The discharge shall not have a pH less than 6.5 nor greater than 8.5.

5. The maximum daily dry weather discharge shall not exceed 2.0 million gallons (7.6×10^6 liters) for Discharge 001 and 1.2 million gallons (4.5×10^6 liters) for Discharge 002.

6. Discharge 003 and 004 shall receive treatment during dry weather conditions.

7. Survival of test fish in 96-hour bioassay of undiluted, unadulterated waste shall be no less than:

Minimum for any one bioassay - - - - 70%

Median for any three or more consecutive bioassays - - - - 90%

C. Sludge Disposal:

1. Neither the discharge nor its treatment, processing, or disposal shall cause a pollution or nuisance as defined in the California Water Code, Section 13050.

2. The discharge of sludges into surface waters or surface water drainage courses is prohibited.

3. Sludge shall be disposed of at a location and in a manner approved by the Executive Officer (See WDR Order No. 78-99)

D. Receiving Water Limitations: Magpie, Arcade, and Second Creeks for Discharge 001-007

1. The discharge shall not cause the dissolved oxygen concentration in the receiving waters to fall below 5.0 mg/l.

2. The discharge shall not cause visible oil, grease, scum, or foam in the receiving waters or watercourses.

3. The discharge shall not cause concentrations of any materials in the receiving waters which are deleterious to human, animal, aquatic, or plant life.

4. The discharge shall not cause esthetically undesirable discoloration of the receiving waters.

5. The discharge shall not cause fungus slimes, or other objectionable growths in the receiving waters.

6. The discharge shall not cause bottom deposits in the receiving waters.

7. The discharge shall not increase the turbidity of the receiving waters by more than 20% over background levels.

8. The discharge shall not increase the temperature of the receiving water above 90°F (32.2°C).

9. The discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are approved pursuant to Section 303 of the Federal Water Pollution Control Act, or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

E. Provisions:

1. Neither the discharge nor its treatment shall create a nuisance as defined in the California Water Code, Section 13050.

2. Transmission and storage facilities shall be maintained to minimize the generation of vectors.

3. The discharger shall not cause degradation of any water supply.

4. All reclaimed wastewater shall conform to the criteria of Title 22, Chapter 4, Section 60301 et. seq., California Administrative Code.

5. Reclaimed wastewater transmission lines shall be clearly marked.

6. The discharger shall provide certified wastewater treatment plant operators in accordance with regulations adopted by the State Water Resources Control Board for the domestic wastewater treatment plant by 1 October 1979.

7. The discharger shall report promptly to the Board any material change or proposed change in the character, location, or volume of the discharge.

8. Reclaimed wastewater shall be well managed to minimize erosion and runoff.

9. The discharger shall comply with toxic and pretreatment requirements pursuant to Section 307 of the Federal Water Pollution Control Act.

10. McClellan Air Force Base shall comply with the following time schedule to assure compliance with Prohibition A.1 of this Order.

Task	Date	Report of Compliance Due
Progress Report	1 Jan 1979	15 Jan 1979
Complete Final Design	1 Jun 1979	15 Jun 1979
Begin Construction	1 Jan 1980	15 Jan 1980
Progress Report	1 Jun 1980	15 Jun 1980
Complete Construction	1 Mar 1981	15 Mar 1981
Full Compliance	1 Jul 1981	15 Jul 1981

The discharger shall submit to the Board on or before each compliance report date, a report detailing his compliance or noncompliance with the specific schedule date and task.

If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the discharger will be in compliance. The discharger shall notify the Board by letter when he has returned to compliance with the time schedule.

11. The discharger shall comply with all the items of the attached "Standard Provisions and Reporting Requirements".

12. The discharger shall comply with the attached Monitoring and Reporting Program No. 78-232 as ordered by the Executive Officer.

13. This Order expires on 1 July 1983 and the discharger must file a Report of Waste Discharge in accordance with Title 23, California Administrative Code, not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.

14. The requirements prescribed by this Order supersede the requirements prescribed by Resolution No. 61-149 adopted on 14 December 1961 and Resolution No. 53-59 adopted on 9 November 1953 which are hereby rescinded.

15. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to this office.

I, JAMES A. ROBERTSON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 17 November 1978.

Original signed by

JAMES A. ROBERTSON,, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 81-015

WASTE DISCHARGE REQUIREMENTS
FOR
McCLELLAN AIR FORCE BASE
DAVIS TRANSMITTER SITE
YOLO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board), finds that:

1. The Board on 16 July 1964 adopted Resolution No. 64-104 which prescribed requirements for a discharge from the Davis Transmitter Site to two stabilization ponds in series.

2. Present waste discharge requirements established by Resolution No. 64-104 are neither adequate nor consistent with present plans and policies of the Board.

3. Report of Waste Discharge dated 5 March 1964 states the Davis Transmitter Site discharges 1700 gallons per day (.07 l/sec) from 12 personnel on site.

4. Davis Transmitter Site is located four miles (6.4 km) southwest of Davis on County Road 36 with surface water drainage to the Yolo By-pass.

5. The beneficial uses of Yolo By-pass are: agricultural supply; limited recreation and esthetic enjoyment; and preservation and enhancement of fish, wildlife, and other aquatic resources.

6. The beneficial uses of the ground water are: domestic, municipal, industrial, and agricultural supply.

7. The Board, on 25 July 1975, adopted a Water Quality Control Plan for the Sacramento River Basin and the Sacramento-San Joaquin Delta Basin. The Basin Plan contains water quality objectives for the Sacramento-San Joaquin Delta.

8. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act in accordance with Section 2714(a)(2), Chapter 3, Title 23, California Administrative Code.

9. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge.

10. The Board in a public meeting heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, that Resolution No. 64-104, be rescinded and McClellan Air Force Base, Davis Transmitter Site, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. The direct discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. The by-pass or overflow of untreated or partially treated waste is prohibited.

B. Discharge Specifications:

1. The discharge shall not cause a pollution or nuisance as defined by the California Water Code, Section 13050.

2. The discharge shall not cause degradation of any water supply.

3. The discharge shall remain within the designated disposal area at all times.

4. Reclaimed wastewater used for irrigation shall meet the criteria contained in Title 22, Division 4, California Administrative Code (Section 60301 et seq.).

5. The dissolved oxygen content of holding ponds shall not be less than 1.0 mg/l for 16 hours in any 24 hour period.

6. Ponds shall be constructed and operated so as to prevent the propagation of mosquitoes and other vectors.

C. Provisions:

1. The Discharger may be required to submit technical or monitoring reports as directed by the Executive Officer.

2. The Discharger shall report promptly to the Board any material change or proposed change in the character, location, or volume of the discharge.

3. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated 21 September 1979, which are a part of this order.

4. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to this office.

5. The Board will review this Order periodically and may revise requirements when necessary.

I, JAMES A. ROBERTSON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 23 January 1981.

JA Robertson

JAMES A. ROBERTSON, Executive Officer

KCH/ap Revised 11/28/80

INFORMATION SHEET

McCLELLAN AIR FORCE BASE
DAVIS TRANSMITTER SITE
YOLO COUNTY

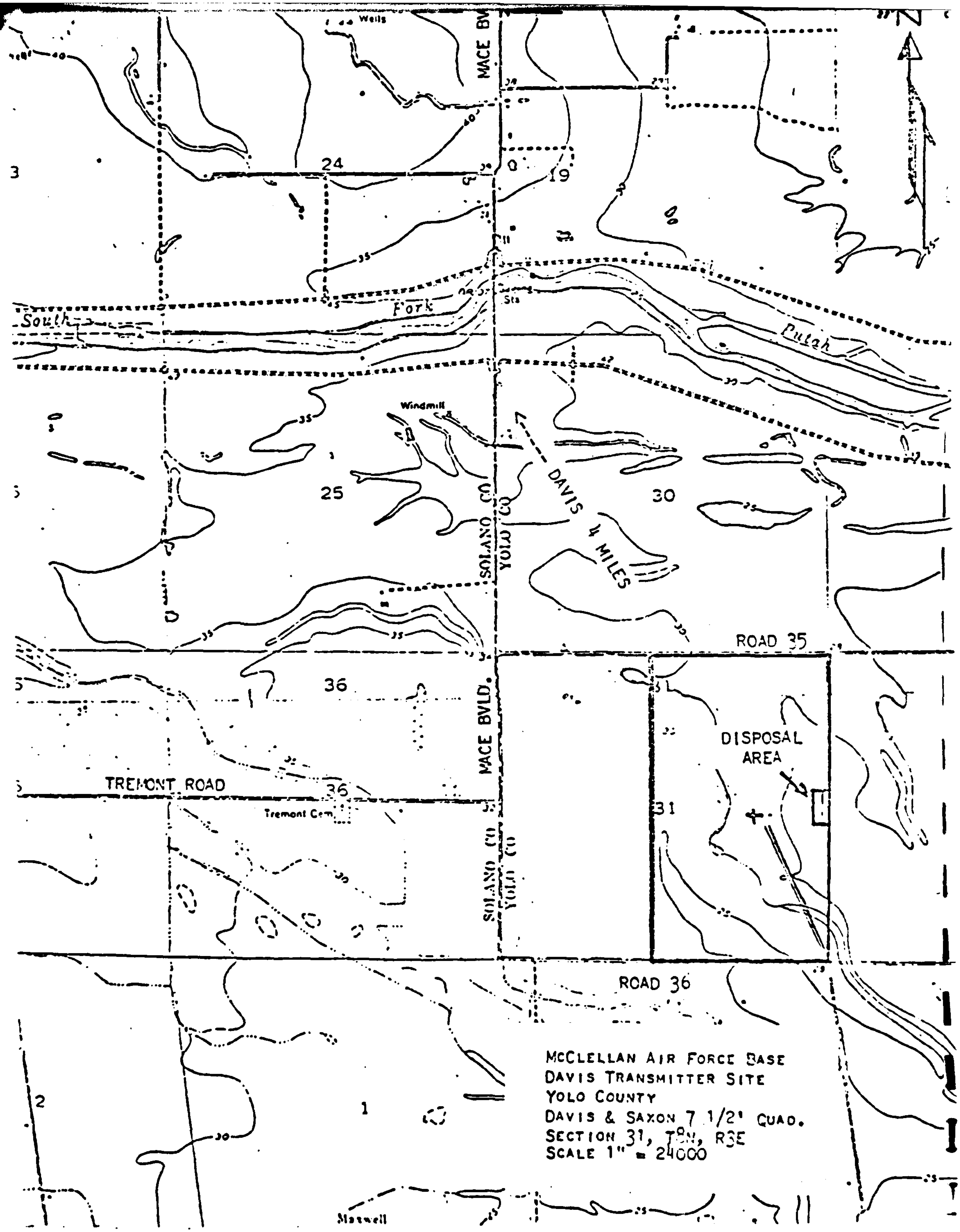
This facility, located some four miles (6.4 km) southeast of Davis, has been in operation for several years. Original waste disposal was by means of a septic tank and underground leach fields. Area soils are largely composed of clay which probably contributed to intermittent leach field failure over the years. Good isolation and the fact that these leach fields were located downwind of living quarters helped to minimize the problem. Surrounding area is devoted solely to agriculture with the nearest residence located nearly a mile (1.6 km) away.

Present population at this station is around 12 persons, none of which live at the site. Past populations have reached 100 at times.

Present waste treatment facilities consist of the original septic tank which now discharges to two ponds measuring 50 x 150 feet (15 m x 46 m) and 4 feet (1.2 m) deep. To prevent overflows, which occur during wet weather, one additional pond was constructed this year.

Annual rainfall is 17 inches (43 cm) with an evaporation rate of 52 inches (1.32 m). The average annual temperature is 76°F (24.4°C).

KCH/ap 12/3/80



MCCLELLAN AIR FORCE BASE
DAVIS TRANSMITTER SITE
YOLO COUNTY
DAVIS & SAXON 7 1/2' QUAD.
SECTION 31, T8N, R3E
SCALE 1" = 24000

Appendix P

McCLELLAN AFB HAZARDOUS WASTE
PERMIT APPLICATION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 2852D AIR BASE GROUP (AFLC)
McCLELLAN AIR FORCE BASE, CALIFORNIA 95652

19 NOV 1980

REPLY TO ATTN OF: DE

SUBJECT: Hazardous Waste Permit Application

TO: Environmental Protection Agency, Region IX
Attn: A-3-2
215 Fremont Street
San Francisco, CA 94105

1. Enclosed is our Part A application to operate hazardous waste treatment, storage and disposal facilities in accordance with Sec 3005(e) of the Resource Conservation and Recovery Act, P.L. 94-580. McClellan Air Force Base is owned by the Department of the Air Force. Sixteen of our seventeen hazardous waste operational units (as defined in Section D of the application packet) are operated by the Department of the Air Force while another operational unit is operated by the Department of Defense Logistics Agency, Defense Property Disposal Office. We are therefore submitting two complete Forms 3 with our one complete Form 1.

2. Part 261.6(b)(6) of your hazardous waste management system regulations require that we submit an application for storage facilities of hazardous wastes which are used, re-used, recycled or reclaimed. This requirement applies to our EPA Hazardous Waste Number D001 wastes consisting of ignitable waste oils, degreasing solvents and jet fuels, which we store at several of our facilities prior to sale to waste oil recyclers. We are informed by Mr. Gary Dietrich, EPA Associate Deputy Administrator for Solid Waste, that EPA will list waste oils as hazardous wastes sometime between January and July 1981. However, the listing would be conditional. For instance, waste oils used for road oiling would be regulated but waste oils which are filtered and blended at a small ratio with new products for use as heating fuel would not be regulated. Since some of our waste oils are blended for use as heating fuel, we expect to significantly revise this Part A application subsequent to your waste oils listing.

3. McClellan Air Force Base has an active program to remove asbestos from existing structures. It is unclear whether you intended to regulate this activity under your hazardous waste management system. EPA Hazardous Waste Number U013 (asbestos) seems to apply to off-specification products which result from asbestos manufacturing activities. Nevertheless, we have included this waste on the 2852 Air Base Group/DE Form 3 in case we have incorrectly interpreted your regulations.

4. Item XA of Form 1 refers to an NPDES permit which is now enforced by the State of California Water Quality Control Board, Central Valley Region. The Board has reissued the permit under the Order Number 78-332.

William Campfield Jr

WILLIAM CAMPFIELD, Jr., Colonel, USAF
Base Commander

1 Atch
Hazardous Waste Permit
Application

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F CA-571724337

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X			D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP MCCLELLAN AIR FORCE BASE

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
2 BRUNNER, PAUL, ENVIRON ENG	916 643 3336

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 2852 AIR BASE GROUP

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 MCCLELLAN AIR FORCE BASE	CA	95652

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 APPROX 5200 WATT AVENUE

B. COUNTY NAME

SACRAMENTO

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE (if known)
6 SACRAMENTO	CA	95652	

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
9711	(specify) National Security	4582	(specify) Airports and Flying Fields
C. THIRD		**D. FOURTH**	
4225	(specify) General Warehousing and Storage	3471	(specify) Electroplating

VIII. OPERATOR INFORMATION

A. NAME: MULTIPLE-SEE ATTACHED 2 EPA FORMS 3510-3

B. Is the name listed in Item VIII-A also the owner? ☐ YES ☒ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

(specify)

D. PHONE (area code & no.)

E. STREET OR P.O. BOX

F. CITY OR TOWN	G. STATE	H. ZIP CODE
MCCLELLAN AIR FORCE BASE	CA	95652

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)	
N CA-0004359	P	
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**	
U	AIR POLLUTION	(specify) See attached Air Pollution Control District permits.
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**	
R	SOLID WASTE	(specify) CVRWQCB Order #78-99 SWMB #34-AA-008

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

McClellan AFB's primary business is to militarily defend the United States by procuring, maintaining, repairing, supplying, distributing and transporting Air Force aircraft, parts, and component systems.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
WILLIAM CAMPFIELD, Jr., Colonel, USAF Base Commander	William Campfield Jr	19 ... 1980

COMMENTS FOR OFFICIAL USE ONLY

C

SACRAMENTO APCD AIR POLLUTION PERMITS

McClellan AFB

OP #	BLDG	DESCRIPTION	OP #	BLDG	DESCRIPTION
5574	22	Paint spray booth	6087	250N	Paint spray booth
5571	54	APC System	5509	250N	Solvent spray booth
5466	243A	Degreaser	5510	250N	Solvent spray booth
5506	243A	Solvent spray booth	5511	250N	Solvent spray booth
5507	243A	Solvent spray booth	5580	250N	Paint remover booth
5508	243A	Solvent spray booth	5581	250	Paint spray booth
6109	243A	Solvent spray booth	5584	250N	Paint spray booth
6110	243A	Ultrasonic cleaner	6086	250N	Solvent spray booth
5575	243A	Paint spray booth	5588	251	Paint spray booth
5467	243B	Degreaser	5607	251	Paint spray booth
5573	243B	Paint spray booth	6088	251	Solvent spray booth
6111	243B	Paint spray booth	5512	252	Solvent spray booth
6112	243B	Solvent spray booth	5514	252	Solvent spray booth
5592	243C	Paint spray booth	5682	252	Paint spray booth
6085	243C	Metal melting furnace	6089	252	Solvent spray booth
5608	243C	Metal melting furnace	5468	351	Degreaser
5609	243C	Metal melting furnace	5515	351	Solvent spray booth
6114	243C	Plasma spray booth	5516	351	Solvent spray booth
6115	243C	Plasma spray booth	5517	351	Solvent spray booth
5475	243D	Degreaser	5469	355	Degreaser
5488	243D	Base cleaning cabinet	5471	355	Ultrasonic cleaner
5528	243D	Solvent spray booth	5521	355	Solvent spray booth
5577	243D	Paint spray booth	5583	355	Paint spray booth
5578	243D	Paint spray booth	6090	355	Solvent spray booth
6116	243D	Vapor blast booth	5472	362	Degreaser
6117	243D	Vapor blast booth	5518	362A	Solvent spray booth
6118	243D	Vapor blast booth	5519	362	Solvent spray booth
5477	243E	Ultrasonic cleaner	5520	362A	Solvent spray booth
5527	243E	Solvent spray booth	5473	368	Degreaser
5586	243E	Paint spray booth	5474	440	Degreaser
5591	243E	Paint spray booth	6090	440	Solvent dip tank
6119	243E	Fiberglass sanding booth	6092	440	Solvent spray booth
5520	243F	Solvent spray booth	5587	443	Paint spray booth
5526	243F	Solvent spray booth	6093	443	Vapor blast honer
5590	243F	Paint spray booth	6094	473C	Paint spray booth
6095	243F	Solvent spray booth	5524	475F	Solvent spray booth
6113	243F	Degreaser	5525	475A	Solvent spray booth
5529	475C	Solvent spray booth	5479	666	Degreaser

OP #	BLDG	DESCRIPTION
[illegible]89	475C	Paint spray booth
[illegible]93	475G	Paint spray booth
[illegible]190	475	Blast cleaning cabinet
6096	475	Paint spray booth
5530	640	Solvent spray booth
5595	640	Paint spray booth
6103	640	Paint spray booth
5476	652	Degreaser
5483	652	Sandblaster
5492	652	Fiberglass sanding booth
[illegible]193	652	Fiberglass sanding booth
5494	652	Fiberglass sanding booth
5495	652	Air pollution control system
[illegible]196	652	Fiberglass control filter
[illegible]66	652	Air pollution control system
5572	652	Air pollution control system
5598	652	Paint spray booth
6105	652	Degreaser
[illegible]523	654	Solvent spray booth
[illegible]96	655	Paint spray booth
[illegible]99	655	Paint spray booth
5600	655	Paint spray booth
5601	655	Paint spray booth
5602	655	Paint spray booth
6104	655	Solvent spray booth
5478	666	Degreaser

OP #	TF #	DESCRIPTION
6938	1	Underground fuel storage tank 1, JP-4
6939	1	Underground fuel storage tank 2, JP-4
6940	1	Underground fuel storage tank 3, JP-4
6941	1	Underground fuel storage tank 4, JP-4
6942	1	Underground fuel storage tank 4, JP-4
6943	1	Underground fuel storage tank 5, JP-4
6944	1	Underground fuel storage tank 6, JP-4
6945	1	Underground fuel storage tank 7, JP-4
6946	1	Underground fuel storage tank 8, JP-4
[illegible]947	7	A.G. floating roof fuel tank, JP-4
[illegible]948	8	A.G. fixed roof fuel tank #1, JP-4

OP #	BLDG	DESCRIPTION
5480	666	Degreaser
5481	666	Degreaser
5499	666	Rotoblaster
5500	666	Tumbleblast
5502	666	Tumbler parts cleaner
5504	666	Vapor blast booth
5505	666	Vapor blast booth
5603	666	Paint spray booth
6097	666	Solvent spray booth
6106	677	Paint spray booth
5604	692	Paint spray building
5570	776	Air pollution control system
5597	783	Paint spray booth
6108	784	Air pollution control system
5568	786	Air pollution control system
6107	837	APC system
5606	1046	Paint spray booth
5560	367	Boiler #4
5331	367	Boiler #1
5332	367	Boiler #2
5563	367	Boiler #3
5564	486	Boiler #15
5565	486	Boiler #16
5555	641	Boiler #24
5556	641	Boiler #26
5612	641	Boiler #25
5557	656	Boiler #21
5558	656	Boiler #22
5559	656	Boiler #23

OP #	TF #	DESCRIPTION
6949	8	A.G. fixed roof fuel tank #2, JP-4
6950	7	JP-4 loading racks
6951	1	JP-4 loading racks
5253	3	Gasoline storage tank
5254	3	Gasoline storage tank
5255	3	Gasoline storage tank
5243	4	Gasoline storage tank
5244	4	Gasoline storage tank
5245	4	Gasoline storage tank
5246	4	Gasoline storage tank
5256	6	Gasoline storage tank

U.S. Environmental Protection Agency
HAZARDOUS WASTE PERMIT APPLICATION

ADDENDUM - GENERAL INFORMATION

FORM 3 RCRA — EPA — U.S. ENVIRONMENTAL PROTECTION AGENCY
HAZARDOUS WASTE PERMIT APPLICATION
Consolidated Permits Program
(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: CA-5717 24337

NAME OF FACILITY
MCCLELLAN AIR FORCE BASE

OPERATOR INFORMATION

A. NAME: E.F. MYERS JR.

B. Is the name listed in Item VIII-A also the owner? ☐ YES ☒ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

F (specify)

D. PHONE (area code & no.): 916 643 5315

E. STREET OR P.O. BOX: 2852 AIR BASE GROUP/DE

F. CITY OR TOWN: MCCLELLAN AIR FORCE BASE

G. STATE: CA

H. ZIP CODE: 95652

INDIAN LAND
Is the facility located on Indian lands? ☐ YES ☒ NO

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: C A - 5 7 1 7 2 4 3 3 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (*mark one box only*) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

X 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

☐ 2. NEW FACILITY *(Complete item below.)*

	YR.	MO.	DAY
8	3 6	0 9	0 8

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | T/A C | 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5	T 0 1	1,200,000	U	
X-2	T 0 3	20	E		6	T 0 3	125	E	
1	S 0 1	254,600	G		7				
2	S 0 2	67,700	G		8				
3	D 8 0	16,500	Y		9				
4	D 8 3	1,350,000	G		10				

III. PROCESS[illegible]

[illegible] SPACE FOR LISTING OTHER PROCESSES (code "T04"). FOR EACH PROCESS ENTERED HERE

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PROCESS CODE	DESCRIPTION	DESIGN CAPACITY	UNIT OF MEASURE
T04 -	Industrial waste sludge dewaterer	0.5	D
T04	Sludge drying beds	3000	U

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four-digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four-digit number(s) from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non-listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				[illegible]cluded with above

Continued ...
NOTE: Phot... ... if you have more than 26 wastes to list — Form Approved OMB No. 158-S80004

EPA I.D. NUMBER		FOR OFFICIAL USE ONLY		
W CA-5717243 37	1	W DUP	2	DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D001	1,028,650	P	S01	S02	T03		
2	D002	40	P	S01				
3	F001	48,250	P	S01				
4	F002	5,450	P	S01				
5	F003	510	P	S01				
6	F006	295,740	P	T01				
7	F007	216,960	P	S01	T01			
8	F008	98,280	P	S01	T01			
9	F009	213,440	P	S01	T01			
10	F017	49,500	P	S01	S02			
11	U013	2,000	P	S01	D80			Storage enclosure for asbestos gloves and material removed from buildings.
12	D007	2,400,000	P	D80	D83	T01	T04	
13	F002							Included with above
14	U077							Included with above
15	U210							Included with above
16	U228							Included with above
17	F004	very small quantities	P	S01				
18	F005	"	P	S01				
19	F010	"	P	S01				
20	P001	"	P	T01				
21	P003	"	P	T01				
22	P008	"	P	T01				
23	P010	"	P	T01				
24	P011	"	P	T01				
25	P021	"	P	S01				
26	P022	"	P	S01				

W C A - [illegible] 1 [illegible] 4 3 3 7 | T/A C: 1

FOR OFFICIAL USE ONLY

W | DUP | T/A C: 2 | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D(1))
27	P024	very small quantities	P	T01				
28	P035	"	P	S01				
29	P056	"	P	T01				
30	P059	"	P	S01				
31	P061	"	P	T01				
32	P073	"	P	T01				
33	P076	"	P	T01				
34	P077	"	P	T01				
35	P078	"	P	T01				
36	P089	"	P	S01				
37	P090	"	P	S01				
38	P099	"	P	T01				
39	P108	"	P	S01				
40	P110	"	P	T01				
41	U001	"	P	T01				
42	U002	"	P	T01				
43	U003	"	P	T01				
44	U006	"	P	T01				
45	U009	"	P	T01				
46	U011	"	P	T01				
47	U012	"	P	T01				
48	U019	"	P	T01				
49	U021	"	P	T01				
50	U031	"	P	T01				
51	U032	"	P	T01				
52	U032	"	P	T01				

EPA I.D. NUMBER (enter from page 1): W C A - 5 7 1 7 2 4 3 3 7 | T/A C: 1

FOR OFFICIAL USE ONLY: W DUP | 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
53	U036	very small quantities	P	S01	
54	U037	"	P	T01	
55	U040	"	P	T01	
56	U043	"	P	T01	
57	U044	"	P	T01	
58	U045	"	P	T01	
59	U047	"	P	T01	
60	U048	"	P	T01	
61	U056	"	P	T01	
62	U057	"	P	T01	
63	U070	"	P	T01	
64	U071	"	P	T01	
65	U072	"	P	T01	
66	U075	"	P	T01	
67	U078	"	P	T01	
68	U080	"	P	T01	
69	U081	"	P	T01	
70	U082	"	P	T01	
71	U092	"	P	T01	
72	U108	"	P	T01	
73	U112	"	P	T01	
74	U113	"	P	T01	
75	U117	"	P	T01	
76	U121	"	P	T01	
77	U122	"	P	T01	
78	U123	"	P	T01	

FOR OFFICIAL USE ONLY

W C A - 5 7 1 [illegible] - [illegible] 4 3 3 7 | 1 | W | DUP | 2 | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
79	U124	very small quantities	P	T01	
80	U125	"	P	T01	
81	U132	"	P	T01	
82	U134	"	P	T01	
83	U135	"	P	T01	
84	U138	"	P	T01	
85	U140	"	P	T01	
86	U144	"	P	T01	
87	U151	"	P	S01	
88	U154	"	P	T01	
89	U156	"	P	T01	
90	U159	"	P	T01	
91	U160	"	P	S01	
92	U161	"	P	S01	
93	U164	"	P	T01	
94	U165	"	P	T01	
95	U169	"	P	T01	
96	U188	"	P	T01	
97	U190	"	P	T01	
98	U197	"	P	T01	
99	U201	"	P	T01	
100	U202	"	P	T01	
101	U205	"	P	T01	
102	U208	"	P	S01	
103	U209	"	P	S01	
[illegible]04	U211	"	P	T01	

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I.D. NUMBER			
W A	1	W	DUP 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
105	U 2 1 2	very small quantities	P	T 0 1				
106	U 2 1 9	"	P	T 0 1				
107	U 2 2 0	"	P	S 0 1				
108	U 2 2 6	"	P	S 0 1				
109	U 2 2 7	"	P	S 0 1				
110	U 2 2 9	"	P	S 0 1				
110	U 2 3 0	"	P	T 0 1				
110	U 2 3 8	"	P	S 0 1				
111	U 2 3 9	"	P	T 0 1				

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

Continued from ...

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3

EPA I.D. NO. (enter from page 1)
F CA-5717243376

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
38 40 02 N	121 23 58 W

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
E United States Air Force	916-643-4723

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST	6. ZIP CODE
F 2852ABG	G McClellan Air Force Base	CA	95652

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
WILLIAM CAMPFIELD, Jr., Colonel, USAF Base Commander	William Campfield Jr	19 Nov 1980

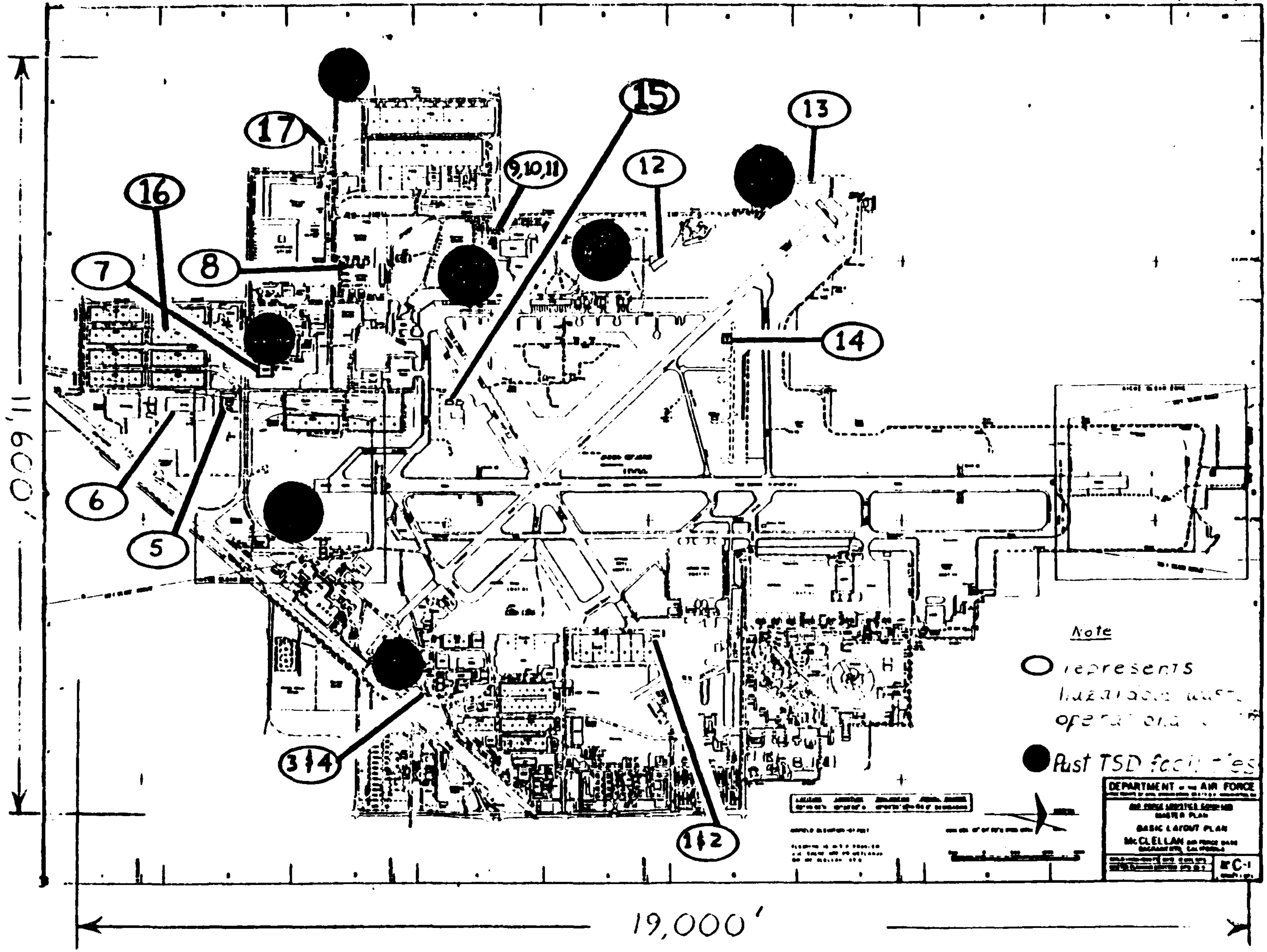
X. OPERATOR CERTIFICATION

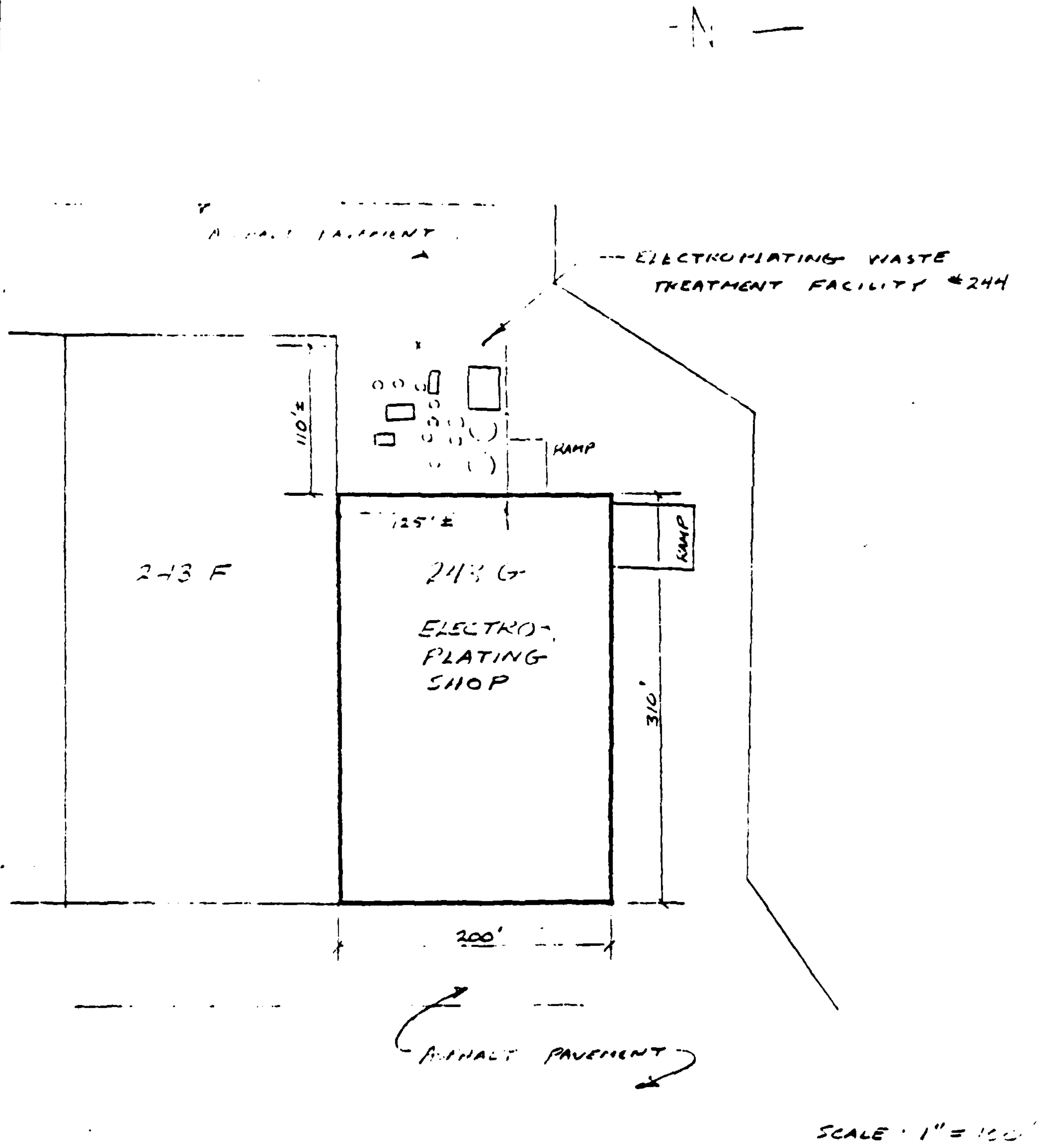
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
E.F. VVE[illegible] Acting Base Civil Engineer	[illegible signature]	18 Nov 80

V. FACILITY DRAWING

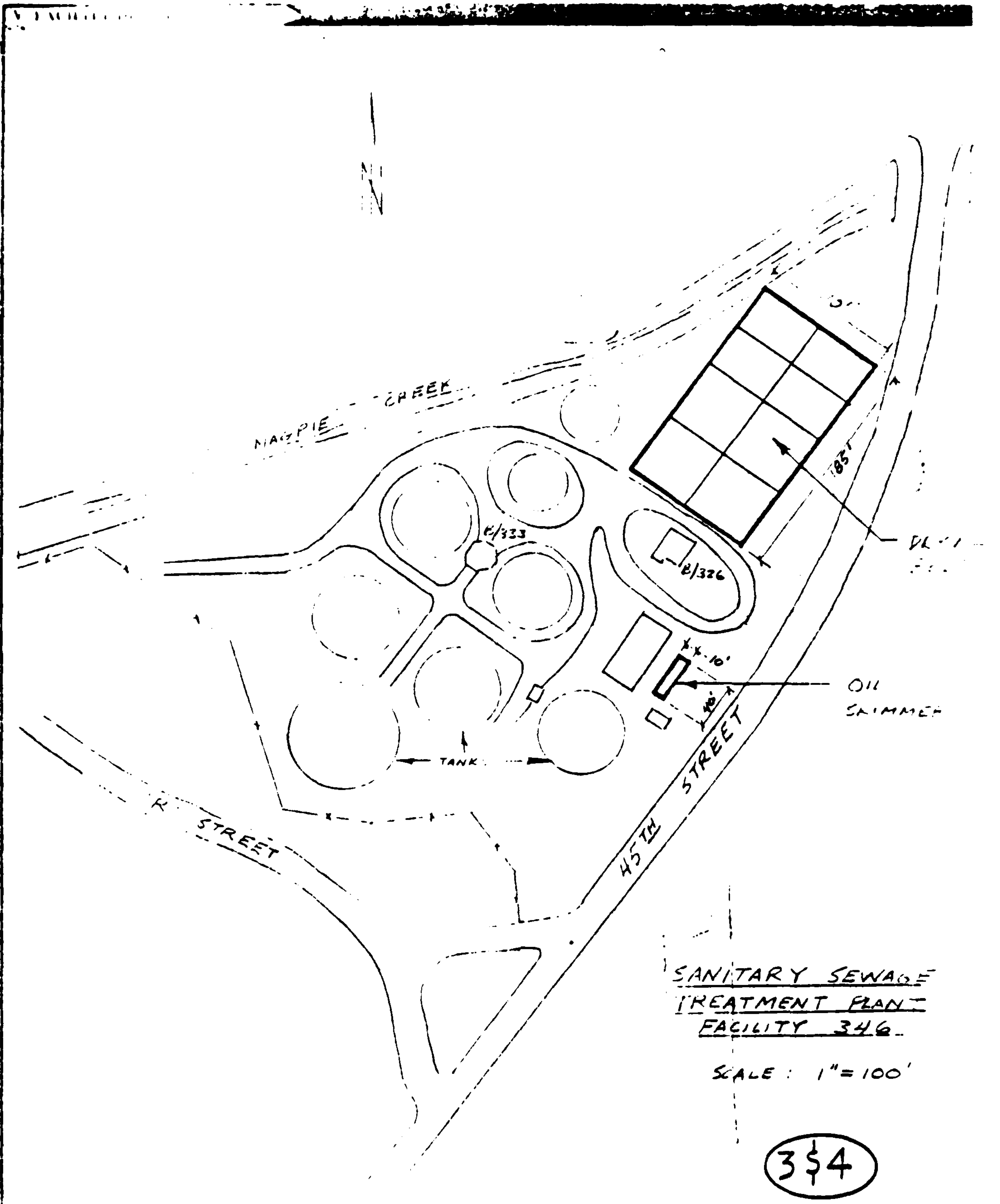
McClellan Air Force Base's hazardous waste facility consists of seventeen operational units, sixteen of which are incorporated in this Form 3 RCRA facility permit application. We are attaching a basic layout of all operational units complete with a series of unit drawings (some units are combined on drawings) in lieu of one hazardous waste facility drawing as you have instructed.


17
16
7
8
9,10,11
15
12
13
14
6
5
3 & 4
1 & 2
11,600'
19,000'
Note
represents
hazardous waste
operational
Past TSD facilities
DEPARTMENT OF THE AIR FORCE
BASIC LAYOUT PLAN
McCLELLAN AIR FORCE BASE
C-1



152

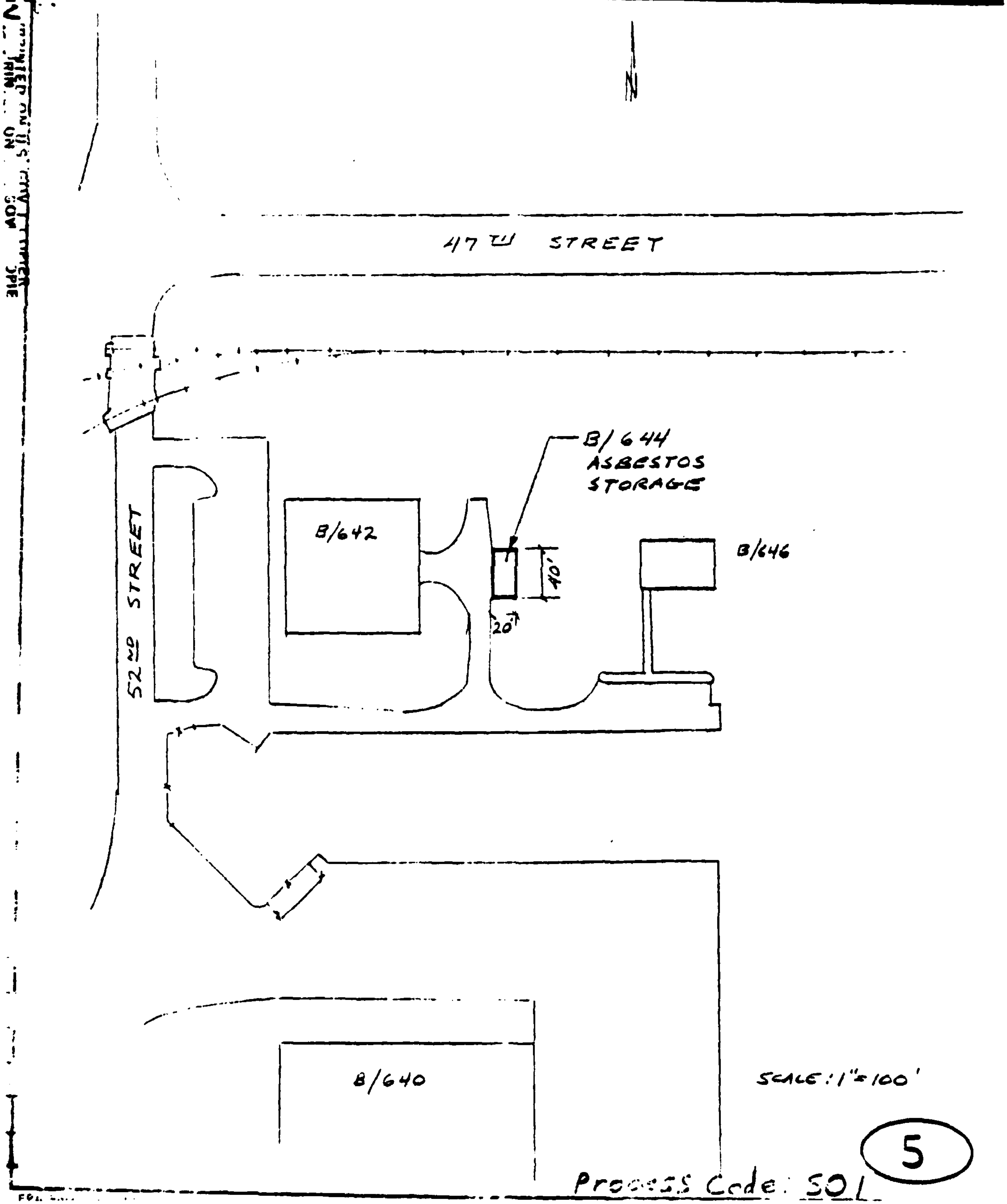
Process Codes: S02 & T01



Process Codes S02 $ T04

V. FACILITY DRAWING

Form Approved OMB No. 158-S80004



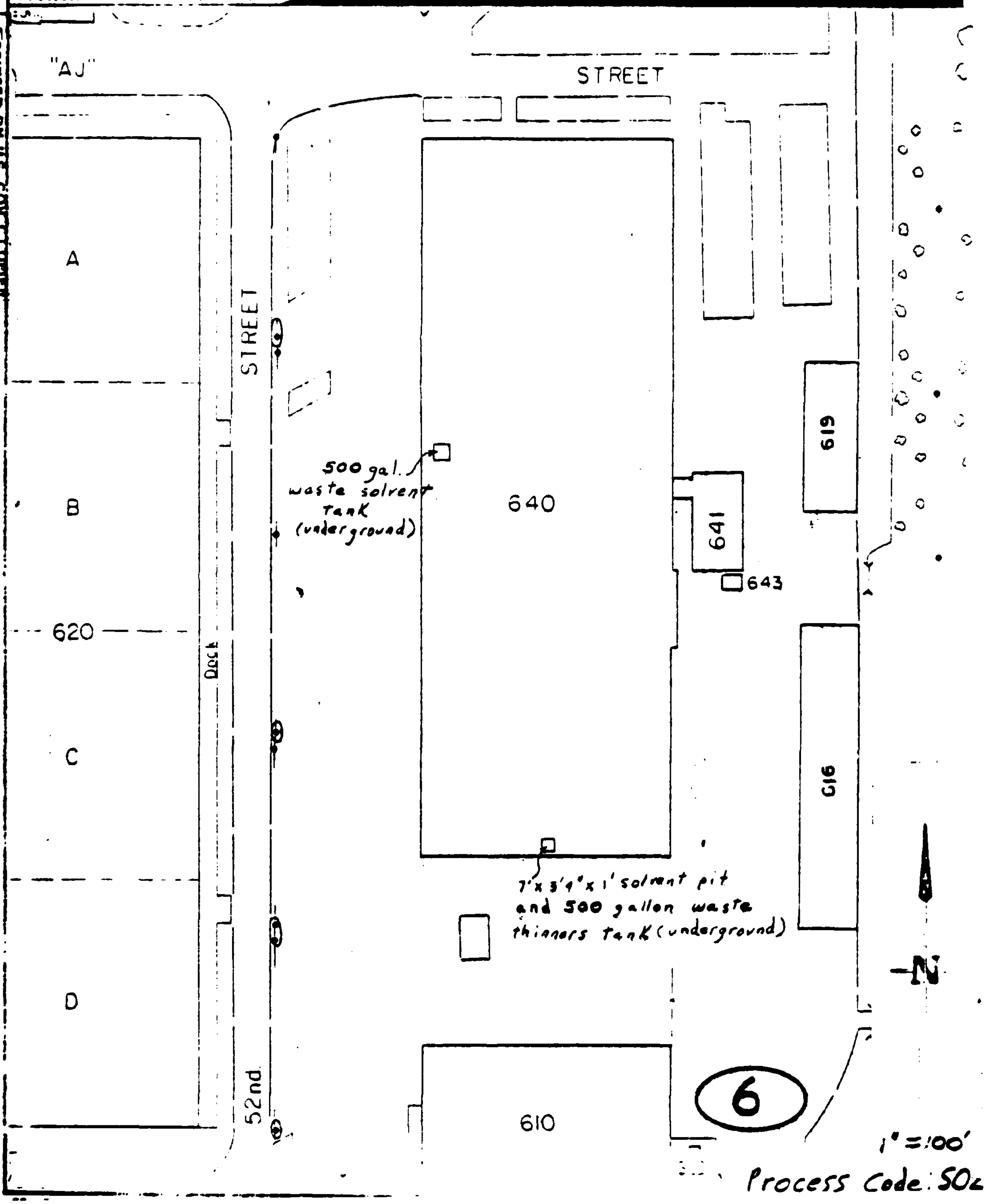
Process Code: S01

5

continued from ...

Form Approved OMB No. 158-S80004

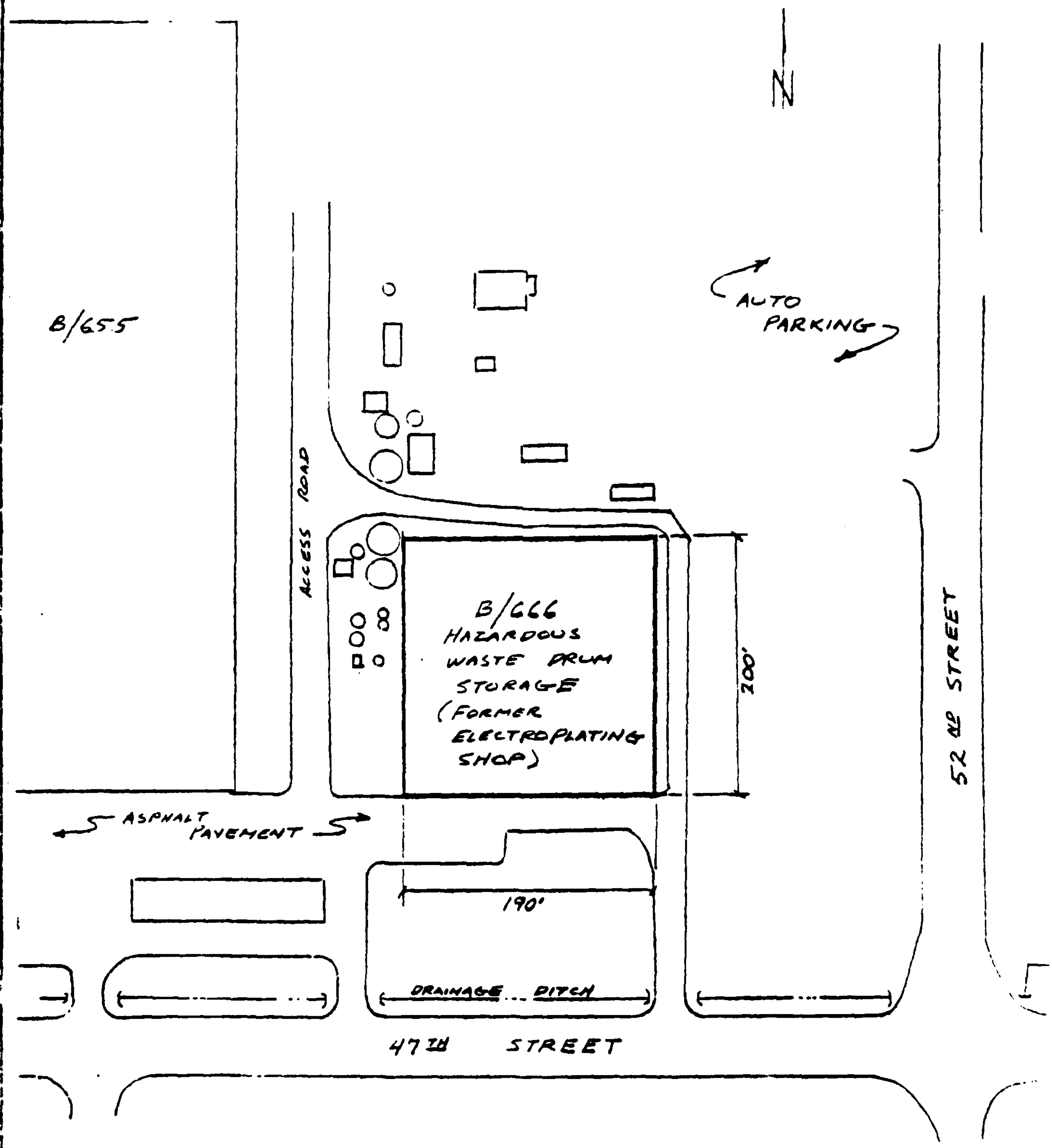
V. FACILITY DRAWING



Continued from page 3

Form Approved OMB No. 158-S80004

V. FACILITY DRAWING (see page 4)

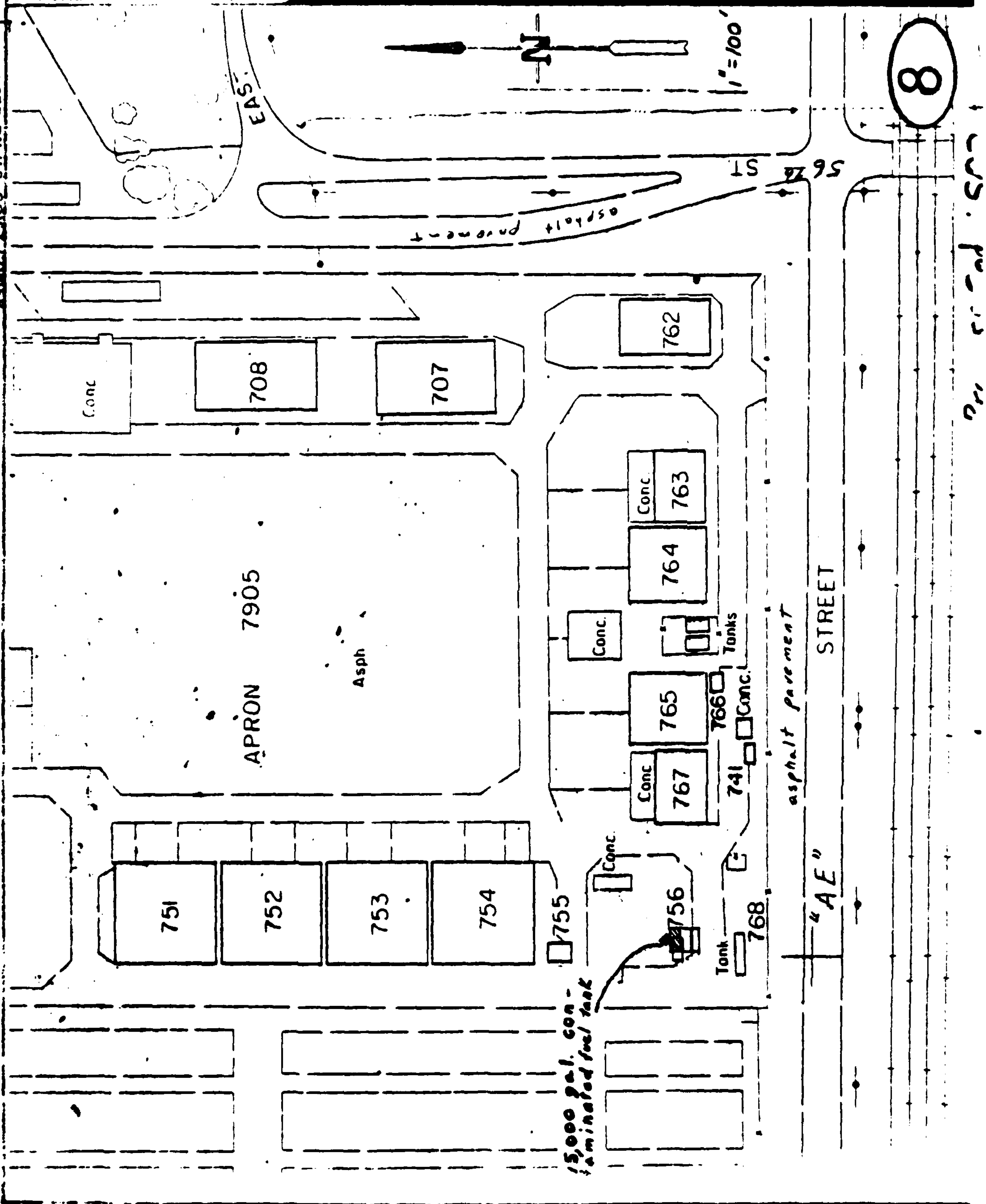


SCALE 1" = 100'

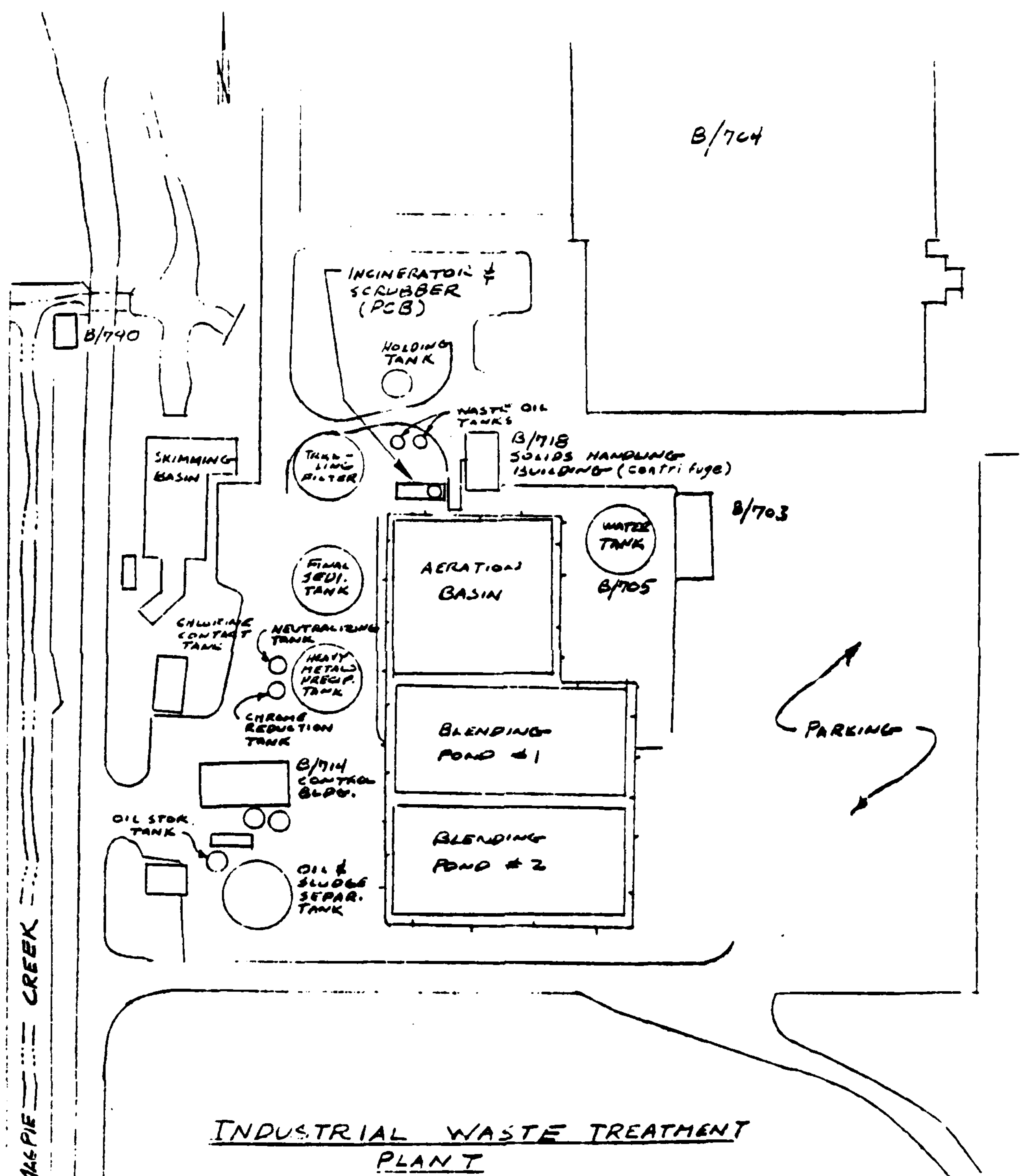
Process Code S01

7

V. FACILITY DRAWING (see page 4)



V. FACILITY DRAWING

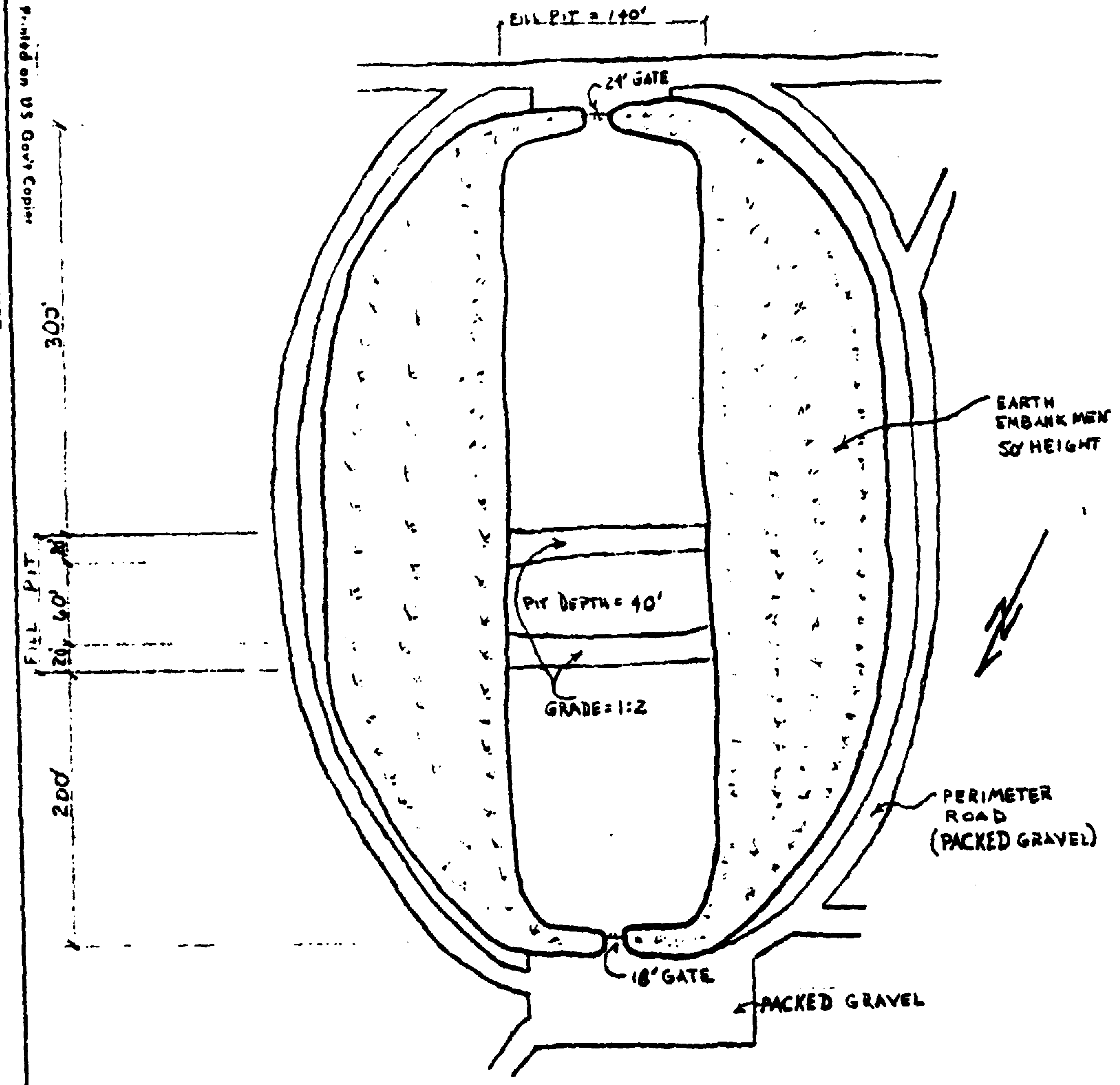


INDUSTRIAL WASTE TREATMENT PLANT

SCALE: 1" = 100'

9,10,11

Process Codes: T01 T03 T04



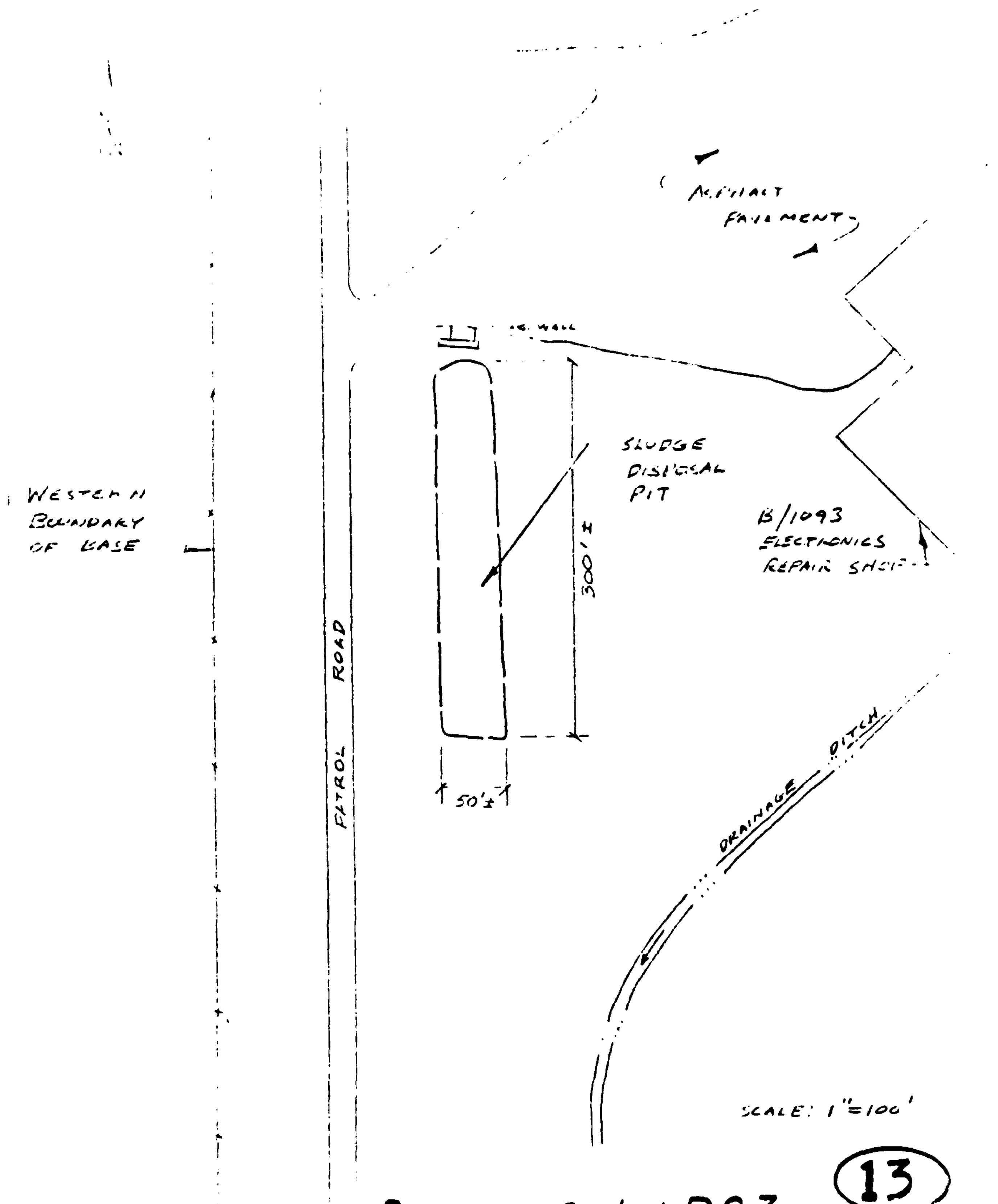
III a. FACILITY PLOT PLAN

BASE DEMOLITION/INDUSTRIAL WASTE SLUDGE LANDFILL

12

Process Code: D80

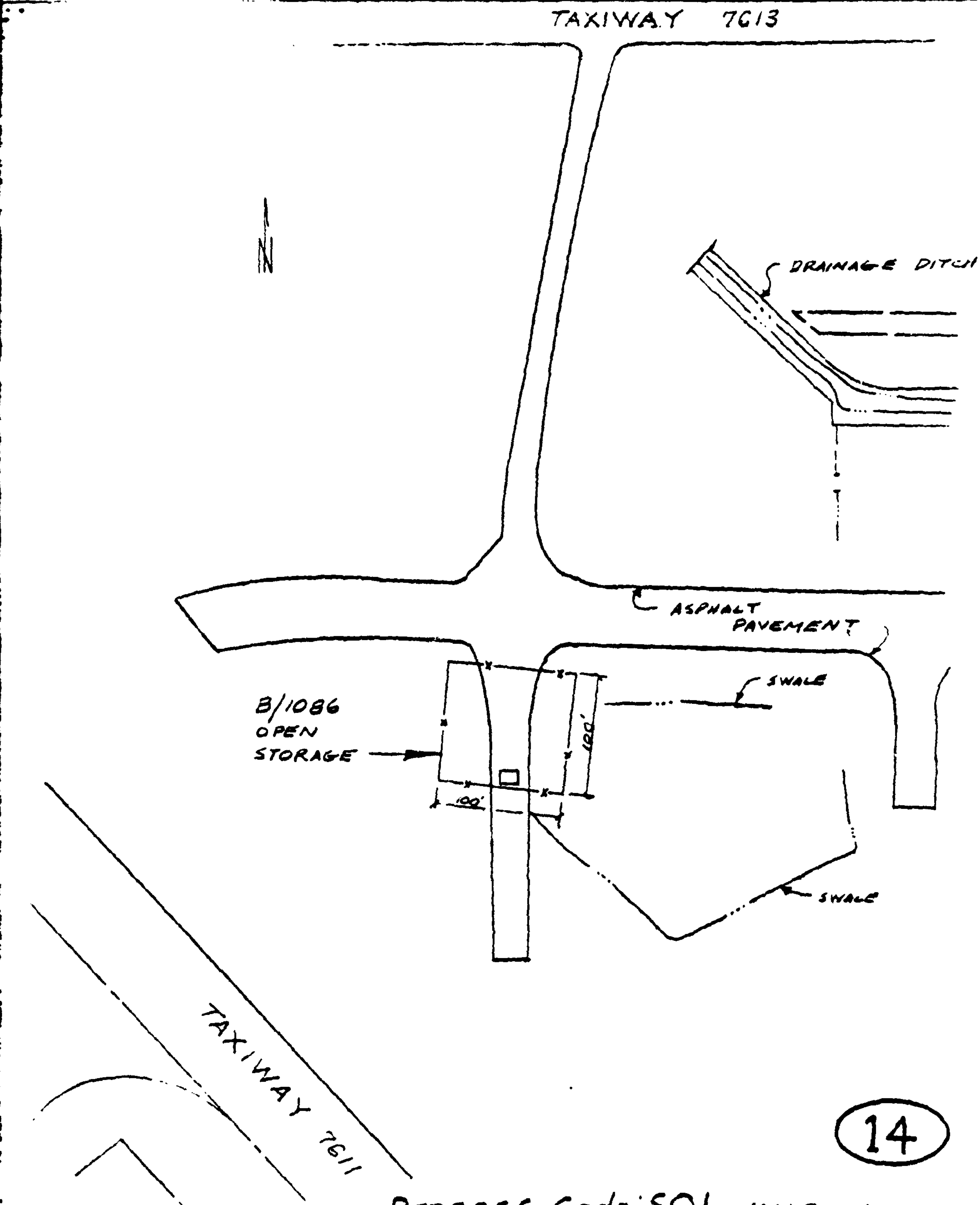
V. FACILITY ...



Process Code: D83

13

V. FACILITY DRAWING

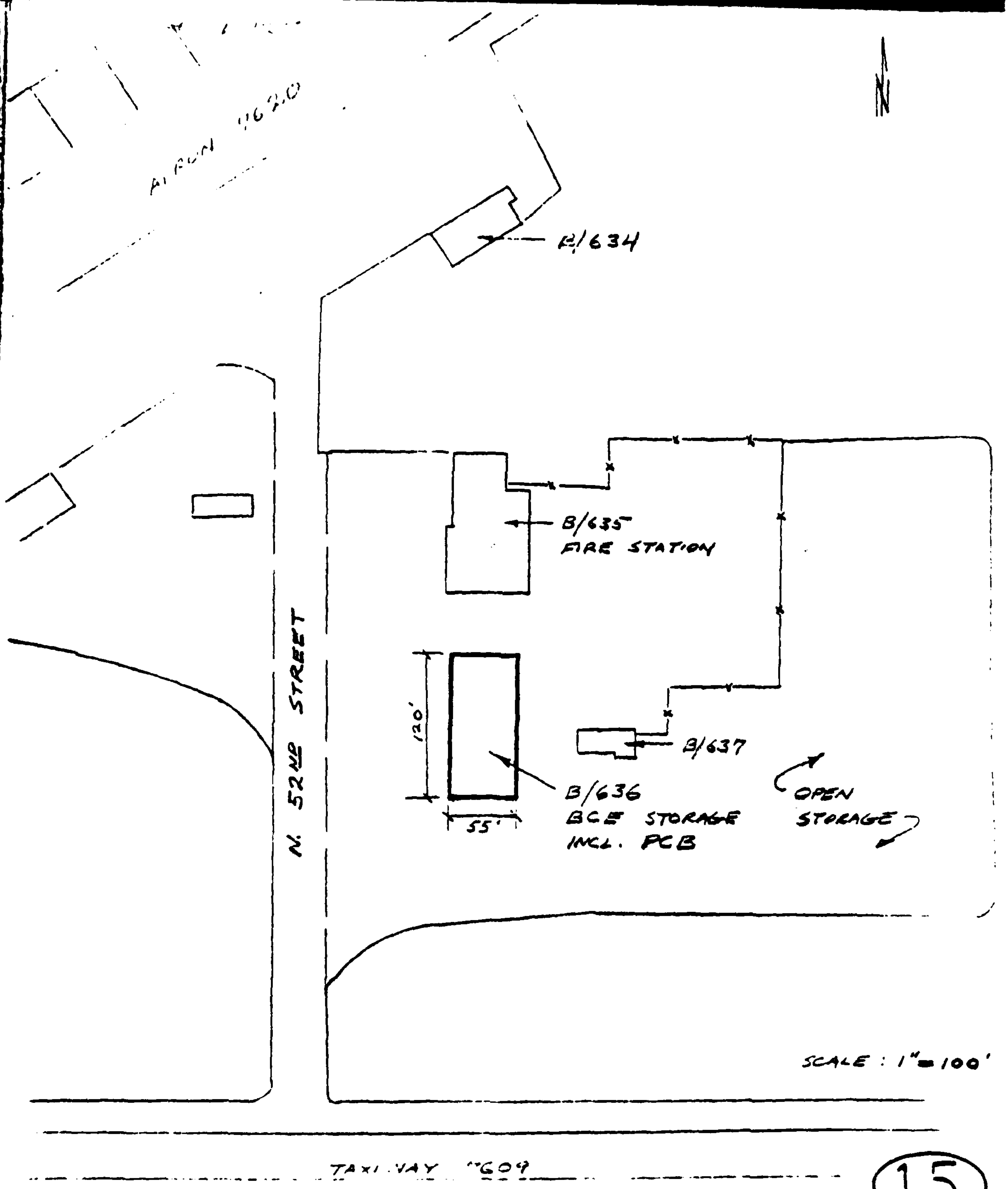


Process Code: SO1 SCALE 1" = 100'

Continued from page ...

Form Approved OMB No. 158-S80004

V. FACILITY DRAWING (see page 4)

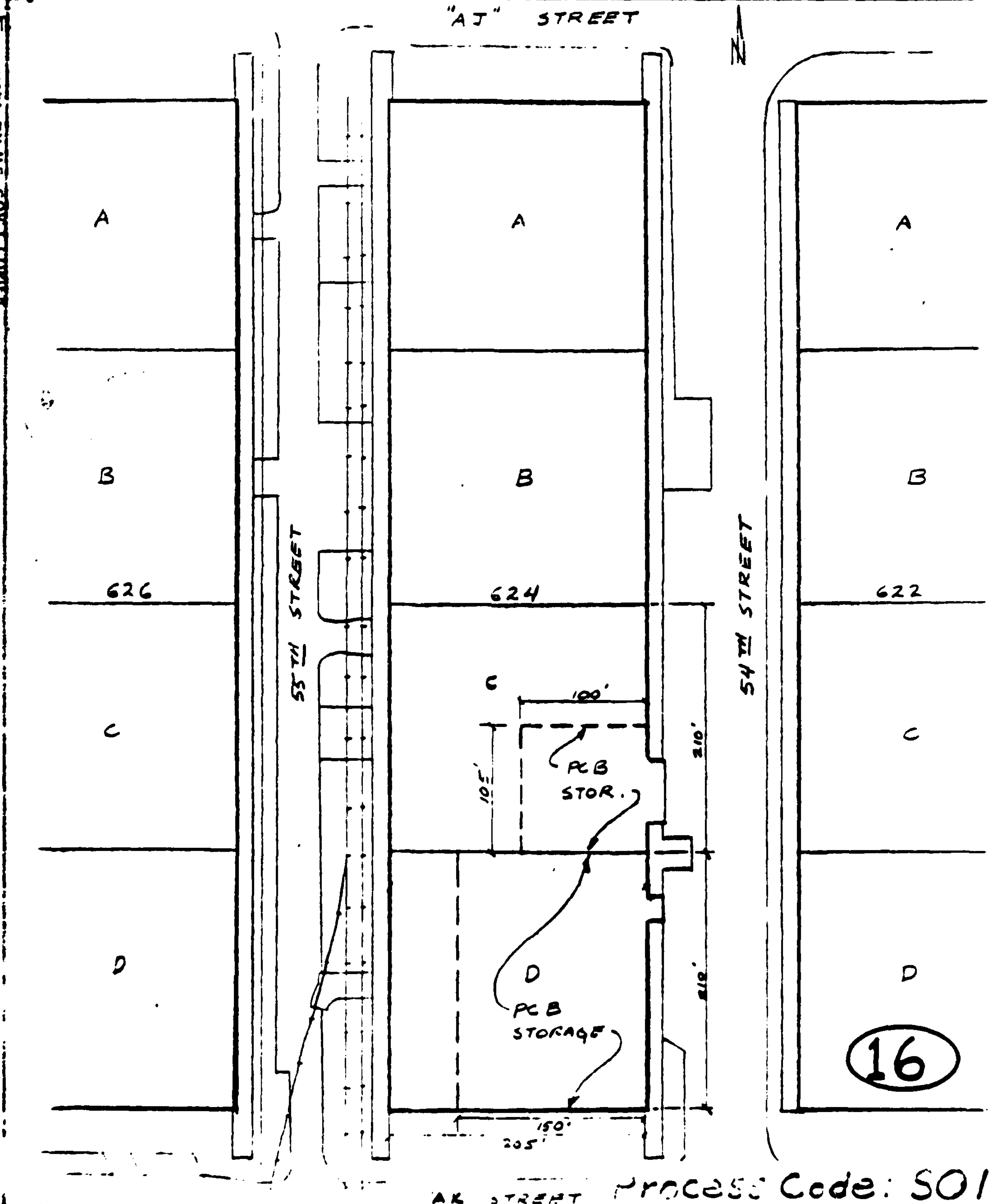


Process Code: ...

15

Form Approved OMB No. 158 S80004

V. FACILITY DRAWING



Process Code: S01

16

EPA Form 3510-3

U.S. Environmental Protection Agency
HAZARDOUS WASTE PERMIT APPLICATION

ADDENDUM - GENERAL INFORMATION

FORM 3 RCRA — EPA — U.S. ENVIRONMENTAL PROTECTION AGENCY
HAZARDOUS WASTE PERMIT APPLICATION
Consolidated Permits Program
(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: CA-571724337 (T/A C: I)

NAME OF FACILITY
SKIP: DEFENSE PROPERTY DISPOSAL OFFICE

OPERATOR INFORMATION

A. NAME: DEAN J EASTON

B. Is the name listed in Item VIII-A also the owner? ☐ YES ☒ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL; M = PUBLIC (other than federal or state); S = STATE; O = OTHER (specify); P = PRIVATE
F (specify)

D. PHONE (area code & no.): 916 643 3284

E. STREET OR P.O. BOX: DLA/DPDO-YKD

F. CITY OR TOWN: MCCLELLAN AIR FORCE BASE

G. STATE: CA

H. ZIP CODE: 95652

INDIAN LAND
Is the facility located on Indian lands? ☐ YES ☒ NO

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

Form Approved OMB No. 158-S80004

I. EPA I.D. NUMBER: I CA-5717724337

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☒ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

☐ 2. NEW FACILITY *(Complete item below.)*

C 8 | YR. 36 | MO. 09 | DAY 08 — FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

YR. __ MO. __ DAY __ — FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.
1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | T/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	449,200	G		7				
2					8				
3					9				
4					10				

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Continued fr

III. PROCESSES

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number(s) from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non–listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – *For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).
2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3	D 8 0			
X-2	D 0 0 2	400	P	T 0 3	D 8 0			
X-3	D 0 0 1	100	P	T 0 3	D 8 0			
X-4	D 0 0 2							included with above

CONTINUE ON PAGE 3

Continue...
NOTE: ... if you have more than 26 wastes to list. Form Approved OMB No. 158-S80004

EPA I.D. NUMBER		FOR OFFICIAL USE ONLY		
W	CA-5717243337 1	W	DUP	2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	P098	1	P	S01				
2	U002	57	P	S01				
3	U031	4	P	S01				
4	U056	2	P	S01				
5	U057	14	P	S01				
6	U151	300	P	S01				
7	U160	55	P	S01				
8	U169	2	P	S01				
9	U210	39	P	S01				
10	U220	7	P	S01				
11	U223	35	P	S01				
12	U228	35	P	S01				
13	U239	468	P	S01				
14	D001	358,050	P	S01				
15	D002	35	P	S01				
16	F001	98,448	P	S01				
17	F002	1,680	P	S01				
18	F003	330	P	S01				
19	F006	54,720	P	S01				
20	F017	115,900	P	S01				
21	F004	very small quantities	P	S01				
22	F005	"	P	S01				
23	P021	"	P	S01				
24	P022	"	P	S01				
25	P035	"	P	S01				
26	P089	"	P	S01				

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

... "C" ... behind the "3" to ...

Continued

IV. DESCRIPTION ... WASTES (continued)

E. USE THIS SPACE ... ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. (enter from page 1)

F CA-5717224337

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

VI. PHOTOGRAPHS

All existing facilities must include photographs (*aerial or ground–level*) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (*see instructions for more detail*).

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
38 40 02N	121 23 58W

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
E United States Air Force	916-643-4723

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST	6. ZIP CODE
F 2852ABG	G McClellan Air Force Base	CA	95652

IX. OWNER CERTIFICATION

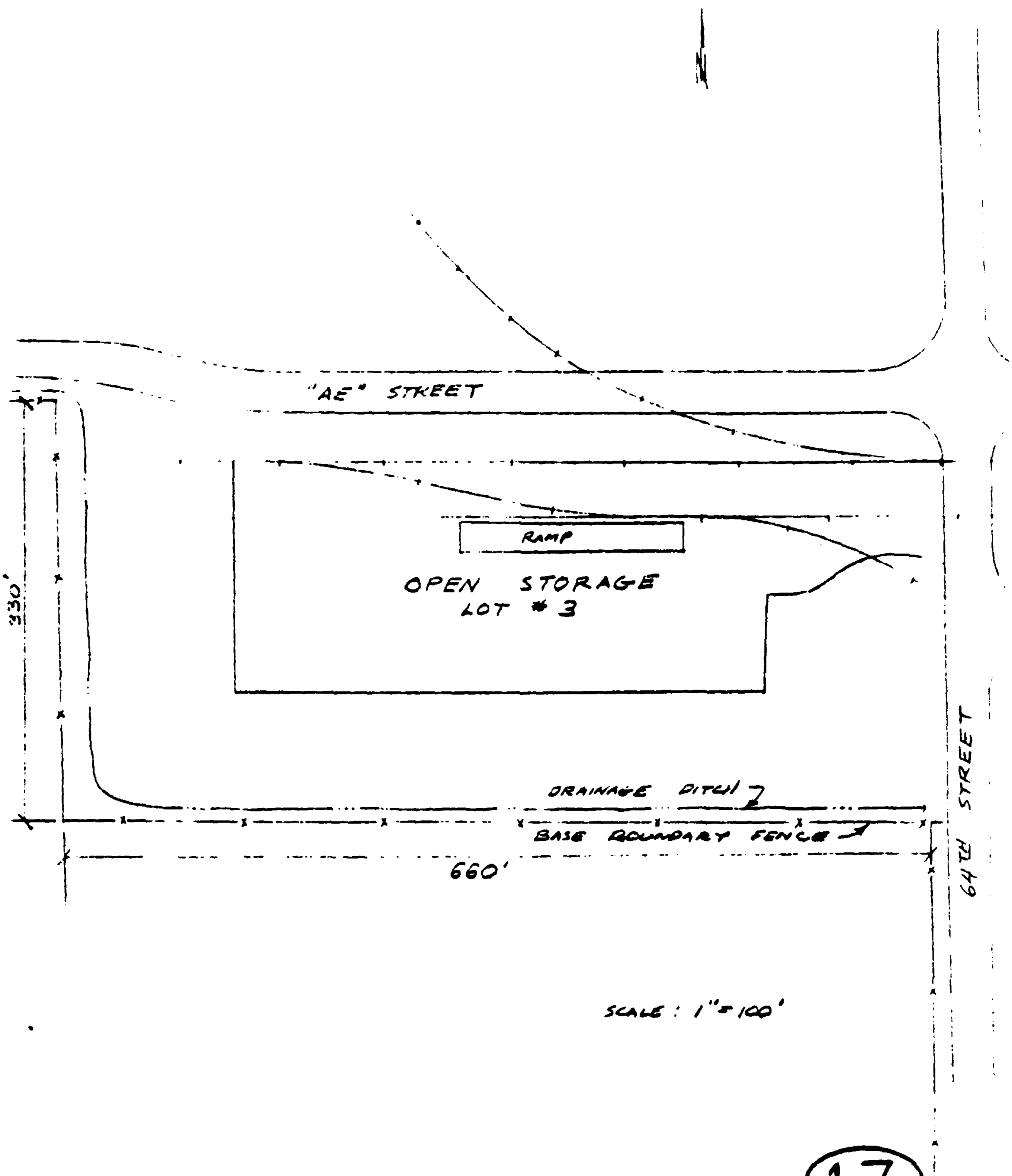
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
WILLIAM CAMPFIELD, Jr., Colonel,USAF Base Commander	William Campfield Jr	19 Nov 1980

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
DEAN J. EASTON Deputy Chief, DLA/YKD		1? Nov 1980



Process Code: SO1

17

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W C A - [illegible] 7 | 1 | W | DUP | 2 | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
27	P090	very small quantities	P	S01	
28	P108	"	P	S01	
29	U036	"	P	S01	
30	U161	"	P	S01	
31	U208	"	P	S01	
32	U209	"	P	S01	
33	U226	"	P	S01	
34	U227	"	P	S01	
35	U229	"	P	S01	
36	U238	"	P	S01	

Appendix Q

PRIORITY RATING OF McCLELLAN AFB
LANDFILLS AND CONTAMINATED SITES
FOR CONTAMINANT MIGRATION POTENTIAL

Table Q-1
McCLELLAN AFB DISPOSAL SITE EVALUATION SUMMARY

Site No.	Site Description	Overall Score	Subscores: Receptors	Subscores: Pathways	Subscores: Waste Characteristics	Subscores: Waste Management Practices
1	Burning/burial pit	61	62	56	70	58
2	Sludge/oil pit	71	62	56	100	67
3	Sludge/burning/burial pit	71	62	56	100	67
4	Sludge/oil pit	72	62	56	100	73
5	Sludge/oil pit	71	62	56	100	67
6	Oil burn pit	71	62	56	100	67
7	Sludge/oil pit	67	56	48	100	67
8	Sludge/burial pit	66	56	48	90	73
9	Burial pit	63	56	48	90	63
10	Burial pit	63	56	48	90	63
11	Burial pit	63	56	48	90	63
12	Burial pit	63	56	48	90	63
13	Burial pit	63	56	48	90	63
14	Burial pit	63	56	48	90	63
15	Sodium valve trench	44	46	48	30	53
16	Sodium valve trench	44	46	48	30	53
17	Burial pit	65	65	46	90	63
18	Burial pit	65	65	46	90	63
19	Burial pit	65	65	46	90	63
20	Sludge/oil pit	64	65	46	90	60

Table Q-1--Continued

Site No.	Site Description	Overall Score	Subscores			
			Receptors	Pathways	Waste Characteristics	Waste Management Practices
21	Sludge/oil pit	64	65	46	90	60
22	Burning/burial pit	66	65	48	90	67
23	Burial pit	35	57	17	30	43
24	Burning/burial pit	37	60	13	30	53
25	Burial pit	37	59	13	30	53
26	Sludge pit	71	62	56	100	67
27	Sodium valve trench	50	62	56	30	53
28	Creek debris sludge pit	50	54	48	50	51
29	Scrap material burner	42	65	13	50	51
30	1155th surface disposal site	50	65	46	60	31
31	Refuse incinerator	41	71	13	50	41
32	Hazardous waste storage	51	65	48	50	43
33	Industrial sludge landfarm	52	57	48	50	56
34	Waste solvent storage tanks	38	60	13	50	37
35	Scrap metal burial pit	34	62	13	30	38
37	Burial pit	34	59	15	30	38
38	Engine repair shop	65	69	54	80	58
39	Burning/burial pit	60	59	56	70	57
40	Industrial sludge drying beds	66	63	56	90	58
41	Burial pit	49	65	54	30	49
42	Oil/burning pits	59	65	48	70	55
43	Burial pit	49	65	54	30	49
44	Paint burial pit	42	62	15	50	51
45	Old salvage yard operation	61	62	21	100	69

Table Q-2
PRIORITY LISTING OF McCLELLAN AFB DISPOSAL SITES

Site No.	Site Description	Overall Score
	HIGH PRIORITY	59 - 72
1	Burning/burial pit	61
2	Sludge/oil pit	71
3	Sludge/burning/burial pit	71
4	Sludge oil pit	72
5	Sludge/oil pit	71
6	Oil burn pit	71
7	Sludge/oil pit	67
8	Sludge/burial pit	66
9	Burial pit	63
10	Burial pit	63
11	Burial pit	63
12	Burial pit	63
13	Burial pit	63
14	Burial pit	63
17	Burial pit	65
18	Burial pit	65
19	Burial pit	65
20	Sludge/oil pit	64
21	Sludge/oil pit	64
22	Burning/burial pit	66
26	Sludge pit	71
38	Engine repair shop	65
39	Burning/burial pit	60
40	Industrial sludge drying beds	66
42	Oil/burning pits	59
45	Old salvage yard operation	61
	MEDIUM PRIORITY	43 - 52
15	Sodium valve trench	44
16	Sodium valve trench	44
27	Sodium valve trench	50
28	Creek debris sludge pit	50
30	1155th surface disposal site	50
32	Hazardous waste storage	51
33	Industrial sludge landfarm	52
41	Burial pit	49
43	Burial pit	49
	LOW PRIORITY	34 - 42
23	Burial pit	35
24	Burning/burial pit	37
25	Burial pit	37
29	Scrap material burner	42
31	Refuse incinerator	41
34	Waste solvent storage tanks	38
35	Scrap metal burial pit	34
37	Burial pit	34
44	Paint burial pit	42

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site Site No. 1, Burning/burial pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1959 to 1962

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 86 138

SUBSCORE 62

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 109 195

SUBSCORE 56

(Factor Score Divided by Maximum Score and Multiplied by 100)

SITE NO. 1

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:

Back-up to main burn pit No. 22; probably received oily wastes, solvents, and plating wastes.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 87 150

SUBSCORE 58

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8 %

OVERALL SCORE 61

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site Nos. 2, 3, 5, 6, 26; Sludge / oil Pits
Location McClellan AFB
Owner/Operator McClellan AFB
Comments
In operation from 1962 to 1979

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6 — SUBTOTALS 86 138
Percentage of Assumed Values = 0 % — SUBSCORE 62
Number of Missing Values = 0 Out of 6 — (Factor Score Divided by Maximum Score and Multiplied by 100)
Percentage of Missing Values = 0 %

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10 — SUBTOTALS 109 195
Percentage of Assumed Values = 0 % — SUBSCORE 56
Number of Missing Values = 0 Out of 10 — (Factor Score Divided by Maximum Score and Multiplied by 100)
Percentage of Missing Values = 0 %

Sites 2, 3, 5, 6, 26

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Sites were used to dispose of undewatered industrial waste sludge. Analysis of contents of similar pit (No. 4) shows high concentrations of VOCs, TCE, and priority pollutants.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicaibe Values = 0 %

SUBTOTALS 101 150

SUBSCORE 67

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assmed Values = 9 %

OVERALL SCORE 71

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 4; Sludge/Oil Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1967 to 1971

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 86 138

SUBSCORE 62

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 109 195

SUBSCORE 56

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 4

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Site was used to dispose of undenatured industrial waste sludge. A recent analysis of the pit contents shows high concentrations of VOCs, TCE, and priority pollutants.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 109 150

SUBSCORE 73

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8 %

OVERALL SCORE 72

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 7; Sludge/Oil Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1966 to 1967

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	78	138
		SUBSCORE		56

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	94	195
		SUBSCORE		48

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 7

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Site was used to dispose of undocumented industrial waste sludge. Analysis of contents of similar pit (No. 4) shows high concentrations of VOCs, TCE, and priority pollutants.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 101 150

SUBSCORE 67

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 9 %

OVERALL SCORE 67

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 8 ; Sludge / Burial Pit

Location: McClellan AFB

Owner/Operator: McClellan AFB

Comments: In operation from 1974 to present

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	78	138
		SUBSCORE		56

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBSCORE (Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	94	195
		SUBSCORE		48

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBSCORE (Factor Score Divided by Maximum Score and Multiplied by 100)

Site 8

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:

Site was used to dispose of dewatered industrial sludge and possibly some waste solvents.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 109 150

SUBSCORE 73

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 66

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Nos. 9, 10, 11, 12, 13, 14; Burial Pits

Location: McClellan AFB

Owner/Operator: McClellan AFB

Comments:

In operation from 1948 - 1974

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS: 78 / 138

SUBSCORE: 56

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS: 94 / 195

SUBSCORE: 48

(Factor Score Divided by Maximum Score and Multiplied by 100)

Sites 9, 10, 11, 12, 13, 14

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:

Sites were used to dispose of ash and residue from the main burn pit No. 26. The sites were probably also used to dispose of industrial waste sludge, solvents, and plating wastes.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 94 150

SUBSCORE 63

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 63

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site Nos. 15, 16; Sodium Valve Trenches

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1940-1950

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	63	138
		SUBSCORE		46

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	94	195
		SUBSCORE		48

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Sites 15, 16

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

Sites were used to dispose of used sodium-filled aircraft engine valves

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	2	3	6	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0%

SUBTOTALS 79 150

SUBSCORE 53

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8%

OVERALL SCORE 44

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site Nos. 17, 18, 19 ; Burial Pits

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1952 to 1959

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 90 138

SUBSCORE 65

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 90 195

SUBSCORE 46

(Factor Score Divided by Maximum Score and Multiplied by 100)

Sites 17, 18, 19

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:

Sites were used to dispose of ash and residue from the main brass pit No. 22. The sites were probably also used to dispose of industrial sludge, solvents, and plating wastes.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0%

SUBTOTALS 94 150

SUBSCORE 63

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8%

OVERALL SCORE 65

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site Nos. 20, 21; Sludge/Oil Pits

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1956 to 1957

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	90	138
		SUBSCORE		65

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	90	195
		SUBSCORE		46

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Sites 20, 21

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:

The sites were used for disposal of industrial sludges and waste solvents.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 90 150

SUBSCORE 60

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 64

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 22; Burning / Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1946 to 1968

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 90 138

SUBSCORE 65

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 94 195

SUBSCORE 48

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 22

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:

This site was the primary waste disposal facility at McClellan AFB from 1946 to 1963. The site was used for burning all refuse and oily wastes - probably received waste oils, solvents, and plating wastes.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 101 150

SUBSCORE 67

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8%

OVERALL SCORE 66

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 23; Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1966 to 1969.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	79	138
		SUBSCORE		57

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	34	195
		SUBSCORE		17

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 22

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspecte small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

The site was used primarily for disposal of paper scrap. The material was removed in 1970 when Building 221 was constructed.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		0	8	0	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicaibe Values = 0 %

SUBTOTALS 64 150

SUBSCORE 43

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8%

OVERALL SCORE 35

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 24; Burning/Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from 1964 to 1969

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	83	138
		SUBSCORE		60

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	25	195
		SUBSCORE		13

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 24

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

Site was used for disposal of demolition debris and scrap material - primarily waste lumber.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 80 150

SUBSCORE 53

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8%

OVERALL SCORE 37

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 25: Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation from the 1940's until the early 1950's.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 81 138

SUBSCORE 59

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 25 195

SUBSCORE 13

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 25

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:
No indications that any hazardous wastes were disposed of at this site.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicaibe Values = 0 %

SUBTOTALS 80 150

SUBSCORE 53

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 7 %

OVERALL SCORE 37

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 27; Sodium Valve Trench
Location McClellan AFB
Owner/Operator McClellan AFB
Comments
In operation from the late 1940s until the early 1950

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	86	138
		SUBSCORE		62

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	109	195
		SUBSCORE		56

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 27

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

Site was used to dispose of used sodium-filled aircraft engine valves.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	2	3	6	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 79 150

SUBSCORE 53

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8 %

OVERALL SCORE 50

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 27; Creek Debris Sludge Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation prior to 1972

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	75	138
		SUBSCORE		54

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	94	195
		SUBSCORE		48

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 28

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Site probably served to contain spills and discharges of industrial wastes in the past.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 76 150

SUBSCORE 51

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 2 %

OVERALL SCORE 50

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 29; Scrap Material Burner
Location McClellan AFB
Owner/Operator McClellan AFB
Comments
In operation during the 1950s and 1960s.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

SUBTOTALS 90 138
SUBSCORE 65
(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

SUBTOTALS 25 195
SUBSCORE 13
(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 29

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Used transformers were stored at this site, some of which may have contained PCBs - small spills may have occurred. The site was also reportedly used to bury 50-60 aircraft generators in 1974 - no indication that hazardous materials were involved.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 76 150

SUBSCORE 51

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 42

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Char::teristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 30; 1155th Surface Disposal Site

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

Surface disposal of small quantities of solvents was practiced from 1960 until 1971

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	90	138
		SUBSCORE		65

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	90	195
		SUBSCORE		46

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 30

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Site was used for surface disposal of small quantities of TCE in the past.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		1	7	7	21
Hazardous Waste Quantity		0	7	0	21
Total Waste Quantity		NA	4		
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		NA	6		
Use of Gas Collection Systems		NA	2		
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 1 Out of 9

Percentage of Assumed Values = 11 %

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicalbe Values = 33 %

SUBTOTALS 35 114

SUBSCORE 31

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 1 Out of 25

Overall Percentage of Assimed Values = 4 %

OVERALL SCORE 50

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 31; Refuse Incinerator
Location: McClellan AFB
Owner/Operator: McClellan AFB
Comments:
In operation from 1963 to 1968

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	98	138
		SUBSCORE		71

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	25	195
		SUBSCORE		13

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 31

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Small spills of solvents and sludges may have occurred.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		NA	4		
Waste Incompatibility		NA	3		
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		NA	6		
Use of Gas Collection Systems		NA	2		
Site Closure		NA	8		
Subsurface Flows		0	7	0	21

Number of Assumed Values = 1 Out of 9

Percentage of Assumed Values = 11 %

Number of Missing and Non-Applicable Values = 5 Out of 9

Percentage of Missing and Non-Applicaibe Values = 56 %

SUBTOTALS 33 81

SUBSCORE 41

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 1 Out of 25

Overall Percentage of Assumed Values = 4 %

OVERALL SCORE 41

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

AD-A124 153 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR MCCLELLAN AIR FORCE BASE CALIFORNIA(U) CH2M HILL GAINESVILLE FL JUL 81 F08637-80-G-0010

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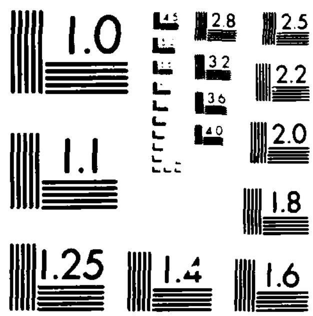

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 32; Hazardous Waste Storage Area
Location: McClellan AFB
Owner/Operator: McClellan AFB
Comments: In operation prior to 1963 until 1975

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	90	138
		SUBSCORE		65

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	94	195
		SUBSCORE		48

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 32

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

The site was used for temporary out-of-doors storage of low-level radioactive and hazardous waste containers. Small spills may have occurred.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		NA	4		
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		NA	6		
Use of Gas Collection Systems		NA	2		
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicalbe Values = 33%

SUBTOTALS 49 114

SUBSCORE 43

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8%

OVERALL SCORE 51

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 33; Industrial Sludge Land Farm
Location McClellan AFB
Owner/Operator McClellan AFB
Comments
In operation 2 to 4 months during 1972

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

SUBTOTALS 78 138
SUBSCORE 57
(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

SUBTOTALS 94 195
SUBSCORE 48
(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 33

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Used for the temporary land farming of industrial waste sludge.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		NA	2		
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 1 out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

SUBTOTALS 81 144
SUBSCORE 56
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 52
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 34; Waste Solvent Storage Tanks

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

Used from 1950 to 1953

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 83 138

SUBSCORE 60

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 25 195

SUBSCORE 13

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 37

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Some small solvent spills may have occurred in this area.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		NA	4		
Waste Incompatibility		0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		NA	6		
Use of Gas Collection Systems		NA	2		
Site Closure		NA	8		
Subsurface Flows		0	7	0	21

Number of Assumed Values = 1 Out of 9

Percentage of Assumed Values = 11 %

Number of Missing and Non-Applicable Values = 4 Out of 9

Percentage of Missing and Non-Applicalbe Values = 44%

SUBTOTALS 33 90

SUBSCORE 37

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 1 Out of 25

Overall Percentage of Assumed Values = 4 %

OVERALL SCORE 38

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 35; Scrap Metal Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation during the 1940s.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

SUBTOTALS 86 138
SUBSCORE 62
(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

SUBTOTALS 25 195
SUBSCORE 13
(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 35

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

The site was used to bury scrap strapping steel during WW II. Most of the material was removed in 1950 during the construction of Building 652.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		0	8	0	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0%

SUBTOTALS 52 150

SUBSCORE 38

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8%

OVERALL SCORE 34

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 37; Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation during the early 1950s.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	12
Land Use/Zoning	2	3	6	6
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	81	138
		SUBSCORE		59

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	29	195
		SUBSCORE		15

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 37

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the *following guidelines:*

Points

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

The site was used to dispose of general refuse. The material was removed during construction of Taxiway 7165 in 1957.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		0	8	0	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 57 150

SUBSCORE 38

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assmned Values = 8%

OVERALL SCORE 34

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 39; Engine Repair Shop
Location McClellan AFB
Owner/Operator McClellan AFB
Comments Old Reciprocating engine repair shop was in operation from 1942 until the late 1950s.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	95	138
		SUBSCORE		69

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	105	195
		SUBSCORE		54

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 38

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

The carbon Removing process used large quantities of dichlorobenzene and cresylic acid. Base well No. 7 was closed in the mid 1950s because of severe cresylic acid contamination.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		NA	4		
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		NA	6		
Use of Gas Collection Systems		NA	2		
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicalbe Values = 33%

SUBTOTALS 66 114

SUBSCORE 58

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8%

OVERALL SCORE 65

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 39; Burning/Burial Pit

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation prior to 1941 until 1946

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	81	138
		SUBSCORE		59

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	109	195
		SUBSCORE		56

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 39

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:

This site was the primary burning and disposal pit for all base wastes until 1946. Solvents and plating wastes may have been disposed at at this site.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		1	4	4	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		0	8	0	24
Subsurface Flows		0	7	7	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0%

SUBTOTALS 85 150

SUBSCORE 57

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8%

OVERALL SCORE 60

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 40; Industrial Sludge Drying Beds

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In use from 1955 to 1972

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 87 138

SUBSCORE 63

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 6 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 109 195

SUBSCORE 56

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 40

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardo s wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:
The four drying beds used to dewater industrial sludge from 1955 to 1972 were not underlined with concrete during this time. The sludge filtrate is suspected to have contained high concentrations of VOCs.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		NA	4		
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		1	6	6	18
Use of Gas Collection Systems		NA	2		
Site Closure		NA	8		
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 3 out of 9
Percentage of Missing and Non-Applicalbe Values = 33%

SUBTOTALS 63 108
SUBSCORE 58
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 66
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site Nos. 41, 43; Burial Pits

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

In operation during the mid 1940s.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

SUBTOTALS 90 138

SUBSCORE 65

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

SUBTOTALS 105 195

SUBSCORE 54

(Factor Score Divided by Maximum Score and Multiplied by 100)

Sites 41, 43

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

The sites were probably used for disposal of demolition debris.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	73	150
			SUBSCORE		49

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicaibe Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 49

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 42; Oil / Burning Pits

Location: McClellan AFB

Owner/Operator: McClellan AFB

Comments: In operation from the mid 1940s until the 1960s.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	3	6	18	18
		SUBTOTALS	90	138
		SUBSCORE		65

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	94	195
		SUBSCORE		48

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 42

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Waste solvents may also have been stored in these pits.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	2	7	14	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		1	8	8	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22 %
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0 %

SUBTOTALS 82 150
SUBSCORE 55
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 59
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 44; Paint Burial Pit
Location McClellan AFB
Owner/Operator McClellan AFB
Comments
In operation during the 1950's.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	86	138
		SUBSCORE		62

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

SUBSCORE (Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	29	195
		SUBSCORE		15

Number of Assumed Values = 0 Out of 10
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 10
Percentage of Missing Values = 0 %

SUBSCORE (Factor Score Divided by Maximum Score and Multiplied by 100)

Site 44

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

The site was used in the 1950s to dispose of 200 to 300 55-gallon drums of hardened latex base paints. The paint may have contained some heavy metal pigments.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0%

SUBTOTALS 76 150
SUBSCORE 51
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 42
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 45; Old Salvage Yard Operation

Location McClellan AFB

Owner/Operator McClellan AFB

Comments

The site was purchased by McClellan AFB in 1972 from the former salvage yard owner

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	86	138
		SUBSCORE		62

Number of Assumed Values = 0 Out of 6

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 6

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	3	5	15	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	40	195
		SUBSCORE		21

Number of Assumed Values = 0 Out of 10

Percentage of Assumed Values = 0 %

Number of Missing Values = 0 Out of 10

Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Site 45

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

PCB spills have been confirmed by laboratory analysis. The source was from salvaged transformers. The salvage yard was in operation prior to 1972 until 1978.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	3	7	21	21
Total Waste Quantity		NA	4		
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		2	6	12	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		NA	2		
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 2 Out of 9

Percentage of Missing and Non-Applicaibe Values = 22%

SUBTOTALS 91 132

SUBSCORE 69

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assimed Values = 8%

OVERALL SCORE 61

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

Appendix R

HAZARD EVALUATION METHODOLOGY

MEMORANDUM

TO: Mr. Bernard Lindenberg, AFESC, Tyndall AFB, FL
Major Gary Fishburn, USAF OEHL, Brooks AFB, TX

FROM: Norman N. Hatch, Jr., CH2M HILL, Gainesville, FL NNH by E/S
Ernest J. Schroeder, Engineering-Science, Atlanta, GA E/S

DATE: July 8, 1981

SUBJECT: Joint Meeting between CH2M HILL and Engineering-Science to develop a uniform site rating system for use in all Air Force Installation Restoration Program Records Search Projects

MEETING LOCATION: CH2M HILL, Gainesville, Florida office

MEETING DATE: Monday, June 29, 1981

A. Introduction and Purpose

A joint meeting was held at the CH2M HILL Gainesville, Florida office on Monday, June 29, 1981. The purpose of the meeting was to develop a uniform site rating system for use in all upcoming Air Force Installation Restoration Program Records Search projects. Attendees at the meeting included:

- Norman N. Hatch, Jr., CH2M HILL Representative
- Ernest J. Schroeder, Engineering-Science Representative
- Major Gary Fishburn, Air Force Observer

The basis for the rating system is the document developed by JRB Associates, Inc., McLean, Virginia, for the EPA Hazardous Waste Enforcement Office, Washington, D.C. The above document presents a methodology for selecting sites for investigation based on their potential for adverse environmental impact. Careful scrutiny of this document by CH2M HILL and Engineering-Science indicated that the rating system could readily be used, with some modifications, for evaluating Air Force installation sites.

Memorandum
July 8, 1981
Page Two

These modifications would be necessary for the following reasons:

1. The methodology presented in the JRB document was developed primarily for large landfill operations throughout the nation. Modifications are necessary to accurately address specific Air Force installation conditions.

2. The rating system must include an equivalent comparison of landfill sites and suspected contaminated sites other than landfills, e.g., PCB spills.

B. Modifications to the JRB Rating System

The specific modifications jointly developed by CH2M HILL and Engineering-Science, based on experience in performing Record Searches at several Air Force installations, are presented in the revised JRB rating form and rating factor system (attached). The modifications, in general, are summarized below:

1. Changes in multipliers for several of the rating factors in the receptors, pathways, and waste management practices categories.

2. Deletion of several existing rating factors and addition of new rating factors in the receptors, pathways, and waste management practices categories.

3. Revision of the waste characteristics category.

4. Special considerations in the use of the waste management practices category to provide meaningful comparison of landfills and contaminated areas other than landfills. These special considerations include:

   a. Use of all nine rating factors for the evaluation of landfills.

   b. Deletion of non-applicable rating factors when evaluating other contaminated areas. The category score is then normalized to provide an equivalent comparison with landfills.

CONCLUSION

All parties present at the meeting agreed that the above modifications would provide a meaningful rating system for Air Force installation sites. The system will be used in the next several Record Searches and then re-evaluated to determine if further modifications are necessary.

NNH/EJS/lmr

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site ____________________

Location ____________________

Owner/Operator ____________________

Comments ____________________

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet		4		
Distance to Nearest Drinking Water Well		15		
Distance to Reservation Boundary		6		
Land Use/Zoning		3		
Critical Environments		12		
Water Quality of Nearby Surface Water Body		6		

Number of Assumed Values = _____ Out of 6

Percentage of Assumed Values = _____%

Number of Missing Values = ____ Out of 6

Percentage of Missing Values = ____%

SUBTOTALS ______ ______

SUBSCORE ______

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination		10		
Level of Water Contamination		15		
Type of Contamination, Soil/Biota		5		
Distance to Nearest Surface Water		4		
Depth to Groundwater		7		
Net Precipitation		6		
Soil Permeability		6		
Bedrock Permeability		4		
Depth to Bedrock		4		
Surface Erosion		4		

Number of Assumed Values = ____ Out of 10

Percentage of Assumed Values = ____ %

Number of Missing Values = ____ Out of 10

Percentage of Missing Values = ____%

SUBTOTALS ______ ______

SUBSCORE ______

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE ______

Reason for Assigned Hazardous Rating:

______

______

______

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		7		
Hazardous Waste Quantity		7		
Total Waste Quantity		4		
Waste Incompatibility		3		
Absence of Liners or Confining Beds		6		
Use of Leachate Collection System		6		
Use of Gas Collection Systems		2		
Site Closure		8		
Subsurface Flows		7		

Number of Assumed Values = ____ Out of 9

Percentage of Assumed Values = ____ %

Number of Missing and Non-Applicable Values = ____ Out of 9

Percentage of Missing and Non-Applicalbe Values = ____ %

SUBTOTALS ______ ______

SUBSCORE ______

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ____ Out of 25

Overall Percentage of Assimed Values = ____ %

OVERALL SCORE ______

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

RATING FACTOR SYSTEM GUIDELINES

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
		RECEPTORS		
Population Within 1,000 Feet	0	1 to 25	26 to 100	Greater than 100
Distance to Nearest Drinking Water Well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet
Distance to Reservation Boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet
Land Use/Zoning	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential
Critical Environments	Not a critical environment	Pristine natural areas	Wetlands, flood-plains, and pre-served areas; presence of economically important natural resources	Major habitat of an en-dangered or threatened species; presence of recharge area
Water Quality Designa-tion of Nearest Surface Water Body	Agricultural or indus-trial use	Recreation, pro-pagation and management of fish & wildlife	Shellfish pro-pagation and harvesting	Potable water supplies
		PATHWAYS		
Evidence of Water Contamination	No contamination	Indirect evidence	Positive proof from direct observation	Positive proof from laboratory analyses
Level of Water Contamination	No contamination	Low levels, trace levels, or levels less than maxi-mum contaminant level (MCL) or EPA drinking water standards	Moderate levels or levels near MCL or EPA drinking water standards	High levels greater than MCL or EPA drink-ing water standards
Type of Contami-nation - Soil/Biota	No contamination	Suspected con-tamination	Moderate contami-nation	Severe contamination
Distance to Nearest Surface Water	Greater than 1 mile	2,001 ft to 1 mile	501 ft. to 2,000 ft.	0 to 500 ft.
Depth to Groundwater	Greater than 500 ft.	51 to 500 ft.	11 to 50 ft.	0 to 10 ft.
Net Precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.
Soil Permeability	Greater than 50% clay (<10^{-6} cm/s)	30% to 50% clay (10^{-4} to 10^{-6} cm/s)	15% to 30% clay (10^{-2} to 10^{-4} cm/s)	0 to 15% clay (>10^{-2} cm/s)
Bedrock Permeability	Impermeable (<10^{-6} cm/s)	Relatively imperme-able (10^{-4} to 10^{-6} cm/s)	Relatively permeable (10^{-2} to 10^{-4} cm/s)	Very permeable (>10^{-2} cm/s)
Surface Erosion	None	Slight	Moderate	Severe

WASTE CHARACTERISTICS	
Judgemental hazardous rating from 30 to 100 points based on the following guidelines:	
Points	**Condition**
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	Accurate records, no unauthorized dumping	Accurate records, no barriers	Incomplete records, no barriers	No records, no barriers
Hazardous Waste Quantity	<1 ton	1 to 5 tons	5 to 20 tons	>20 tons
Total Waste Quantity	0 to 10 acre ft.	11 to 100 acre ft.	101 to 250 acre ft.	Greater than 250 acre ft.
Waste Incompatibility	No incompatible wastes are present	Present, but does not pose a hazard	Present and may pose a future hazard	Present and posing an immediate hazard
Absence of Liners or Confining Strata	Liner and confining strata	Liner or confining strata	Low quality liner or low permeability strata	No liner, no confining strata
Use of Leachate Collection Systems	Adequate collection and treatment	Inadequate collection or treatment	Inadequate collection and treatment	No collection or treatment
Use of Gas Collection Systems	Adequate collection and treatment	Collection and controlled flaring	Venting or inadequate treatment	No collection or treatment
Site Closure	Impermeable cover	Low permeability cover	Permeable cover	Abandoned site, no cover
Subsurface Flows	Bottom of landfill greater than 5 ft. above high groundwater level	Bottom of landfill occasionally submerged	Bottom of fill frequently submerged	Bottom of fill located below mean groundwater level

JRB RATING SYSTEM
INTRODUCTION AND METHODOLOGY

Source:

"Methodology for Rating the Hazard
Potential of Waste Disposal Sites,"
JRB Associates, Inc., December 15, 1980

CHAPTER 1.0 INTRODUCTION

As part of EPA's nationwide waste management program, land disposal facilities containing hazardous wastes will be investigated and evaluated. Remedial action plans will be formulated for those sites presenting a significant hazard. Because resources for this task are limited, the initial focus of the work must be on the most hazardous sites. Under the auspices of EPA's Office of Enforcement, JRB Associates has devised a methodology for selecting sites for investigation based on their high potential for environmental impact.

This methodology has several advantages over other rating systems:

- It is easy to use
- It does not require users to have an extensive technical background
- It uses readily available information
- It does not require complex chemical or hydrological analyses
- It does not require users to visit the facilities in question
- It allows sites to be rated even if some data needs cannot be met.

The system consists of 31 rating factors that are divided into 4 categories: receptors; pathways; waste characteristics; and waste management practices. Factors in the receptors category determine the prime targets of environmental contamination. Factors in the pathways category assess mecha nisms for contaminant migration. Factors in the waste characteristics category examine the types of hazards posed by contaminants in the site. Factors in the waste management practices category evaluate the quality of the facility's design and operation. Each rating factor has an associated four-level scale. Because all of these factors are not of equal importance, each also has been assigned a weighing factor, called a multiplier. Raters must simply decide which level of the rating factor's scale is most appropriate for a given site and multiply the numeric value of that level by the corresponding multiplier. The sum of the products for the 31 factors divided by the maximum possible score and multiplied by 100 is the site's rating. The ratings are on a scale of 0 to 100 and can be interpreted in relative or absolute terms.

Users can assign additional points when the rating factors do not adequately address all of the problems of a site. However, only a limited number of additional points can be assigned. This arrangement helps to ensure that a site's rating is both complete and objective.

The methodology has been designed primarily for landfills, surface impoundments, and other types of land-based storage and disposal facilities. Incinerators and waste treatment facilities, however, are beyond scope with the exception of the solid wastes produced by them.

Site ratings should be performed as part of an overall investigation procedure. Prior to a site visit, ratings can be based on published materials, public and private records, and contacts with knowledgable parties. The results of this type of rating can be used to determine which sites present the greatest potential hazard and should be visited first. A final rating can be obtained with information obtained from a visit to a site. This rating can be used as a tool to help determine how limited resources should be spent for additional sampling, which may be required to fill data gaps, and for preparing remedial action plans and/or enforcement cases for sites that represent particularly severe hazards.

The methodology's validity has been tested at sites across the country. This testing includes comparing ratings completed for the same facilities both by different raters, and before and after site visits. Officials of New Jersey's Department of Environmental Protection agreed that the ratings on 30 sites in their state were good reflections of the true hazard potential of those sites. These results show that the methodology is an exceptionally useful and efficient tool for classifying and ranking the hazard potential of land disposal facilities.

The methodology is discussed in more detail in the following four chapters. Chapter 2 describes the six basic components of the methodology. Chapter 3 identifies sources of information for the system and describes how to resolve data gaps. Chapter 4 presents the step-by-step procedure for rating sites, and Chapter 5 discusses how site ratings can be used. The three appendices provide guidance for rating sites. Finally, the glossary located at the end of this document defines all terms related to the methodology.

CHAPTER 2.0 DESCRIPTION OF THE METHODOLOGY

The site rating methodology has been developed in terms of six elements. These are:

- Factor categories
- Rating factors
- Rating scales
- Multipliers
- Additional points
- Hazard potential scores.

These elements are described below.

2.1 FACTOR CATEGORIES

In assessing the environmental impacts of any hazardous waste disposal site, four considerations must be addressed. These are:

- Receptors
- Pathways
- Waste characteristics
- Waste management practices.

Receptors refer to the biota (human and non-human) which are potentially affected by the materials released from a waste disposal site. Within this category, special attention is given to human populations and critical environments. Pathways refer to aspects of the routes by which hazardous materials can escape from a given site. The focus of this cateory is on the ease of migration of water soluble pollutants and on contamination due to the site. Waste characteristics refer to the types of hazards posed by materials in the facility in terms of both their health-related effects and their environmental mobility. Waste management practices refer to the design characteristics and management practices of a given disposal site as they relate to the site's environmental impact. In particular, this category examines measures that are being taken to minimize exposure to hazardous wastes.

The prime importance of the factor categories is in partitioning the rating factors into manageable groups so that site ratings can be more easily and completely interpreted. This topic is discussed in greater detail in Chapter 5.

2.2 RATING FACTORS

The initial rating of a waste disposal facility is based on a set of 31 rating factors. Each of these has been assigned to one of the four factor categories. The receptors catgegory has five rating factors:

- "Residential population within 1,000 feet" and "Distance to the nearest off-site building" measure the potential for human exposure to the site
- "Distance to the nearest drinking-water well" measures the potential for human ingestion of contaminants should underlying aquifers be polluted
- "Land use/zoning" evaluates the current and anticipated uses of the surrounding area
- "Critical environments" assesses the potential for adversely affecting important biological resources and fragile natural settings.

The pathways category contains nine rating factors concerned with the potential migration and attenuation of contaminants. The primary focus is on waterborne pollutants, since they can affect the greatest number of people.

- "Distance to the nearest surface water" and "Depth to groundwater" measure the availability of pollutant migration routes
- "Soil permeability," "bedrock permeability," and "depth to bedrock" measure the potential for contaminant attenuation and ease of migration

- "Net precipitation" uses annual precipitatior and evapotranspiration to estimate the amount of leachate a site produces

- "Evidence of contamination," "type of contamination," and "level of contamination" evaluate pollution currently apparent at the site.

The waste characteristics category contains rating factors which examine the waste's environmental mobility and the adverse effects it can cause.

- "Solubility," "volatility," and "physical state" measure the extent to which mobile wastes can leave the site

- "Toxicity," "radioactivity," and "persistence" assess the site's potential to cause health-related injuries

- "Ignitability," "reactivity," and "corrosiveness" evaluate the possibility of fire, explosion, or similar emergencies.

The waste management practices factor category evaluates site design and operation. This category includes eight rating factors:

- "Use of leachate collection systems," "use of gas collection systems," and "use of liners" examine features of site design for containing contamination

- "Site security" assesses the measures taken to limit site access

- "Total waste quantity" and "hazardous waste quantity" measure the quantity of waste in the site, and thus, the potential magnitude of resulting contamination

- "Waste incompatibility" evaluates the potential for incompatible wastes to combine and pose a hazard

- "Use of containers" assesses the adequacy of using containers to isolate wastes.

These factors have been selected because they are relevant to an evaluation of any land-based disposal facility. The definition and purpose of each rating factor appear in Appendix A.

2.3 RATING SCALES

For each of the factors, a four-level rating scale has been developed which provides factor-specific levels ranging from "0" (indicating no potential hazard) to "3" (indicating a high potential hazard). The rating factors and their corresponding rating scales for each of the factor categories are listed in Table 1. These scales have been defined so that the rating factors typically can be evaluated on the basis of readily available information from published materials, public and private records, contacts with knowledgeable parties, or site visits. Raters compare the information collected for a site with the limits set in the scales, and see which level of each scale most closely fits the information. The numeric value of that level is the factor rating for that factor. This process is described in more detail in Chapter 4. Additional guidance for assessing the rating scales appears in Appendix A.

2.4 MULTIPLIERS

The rating factors do not all assess the same magnitude of potential environmental impact. Consequently, a numerical value called a multiplier has been assigned to each factor in accordance with the relative magnitude of impact that it does assess. These values are multiplied, hence the term multiplier, by the appropriate factor ratings (see Section 2.3) to result in factor scores for each of the rating factors. The 31 multipliers appear as the third column from the right on the methodology's two-page Rating Form (see Figure 3).

2.5 ADDITIONAL POINTS

Special features of a facility's location, design, or operation are frequently encountered that cannot be handled satisfactorily by rating factors alone. These features might present hazards that are unusually serious, unique to the site, or not assessable by rating scales. For example, an extremely high population density near a site should be considered even more hazardous than the rating factor for "population within 1,000 feet" indicates.

Power lines running through sites containing explosive or flammable wastes, though not generally typical of waste disposal sites, should be considered a potential hazard. Finally, the function of the nearest off-site building might indicate a serious threat of human exposure exists, even though types of functions cannot be quantitatively evaluated by rating scales the way distance can be. In such cases, raters should assign a greater hazard potential score to a site than it might otherwise receive by using the additional points system. To guide raters as to the types of situations that might warrant additional points, several examples have been identified for each of the factor categories. These are:

RECEPTORS

- Use of site by local residents
- Neighboring land use
- Neighboring transportation routes, drinking water supplies, and important natural resources.

PATHWAYS

- Extreme runoff and erosion problems
- Slope instability
- Flooding
- Seismic activity.

WASTE CHARACTERISTICS

- Carcinogenicity, mutagenicity, and teratogenicity
- Infectiousness
- Low biodegradability
- High-level radioactivity.

WASTE MANAGEMENT PRACTICES

- Excessively large waste quantities
- Open burning of wastes
- Site abandonment
- Unsafe disposal practices
- Inadequate cover
- Inadequate safety precautions
- Inadequate recordkeeping.

Table 1. Rating Factors and Scales for Each of the Four Factor Categories (Continued)

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
RECEPTORS				
POPULATION WITHIN 1,000 FEET	0	1 TO 25	26 TO 100	GREATER THAN 100
DISTANCE TO NEAREST DRINKING WATER WELL	GREATER THAN 3 MILES	1 TO 3 MILES	3,001 FEET TO 1 MILE	0 TO 3,000 FEET
DISTANCE TO NEAREST OFF-SITE BUILDING	GREATER THAN 2 MILES	1 TO 2 MILES	1,001 FEET TO 1 MILE	0 TO 1,000 FEET
LAND USE ZONING	COMPLETELY REMOTE (ZONING NOT APPLICABLE)	AGRICULTURAL	COMMERCIAL OR INDUSTRIAL	RESIDENTIAL
CRITICAL ENVIRONMENTS	NOT A CRITICAL ENVIRONMENT	PRISTINE NATURAL AREAS	WETLANDS, FLOODPLAINS, AND PRESERVED AREAS	MAJOR HABITAT OF AN ENDANGERED OR THREATENED SPECIES
PATHWAYS				
EVIDENCE OF CONTAMINATION	NO CONTAMINATION	INDIRECT EVIDENCE	POSITIVE PROOF FROM DIRECT OBSERVATION	POSITIVE PROOF FROM LABORATORY ANALYSES
LEVEL OF CONTAMINATION	NO CONTAMINATION	LOW LEVELS, TRACE LEVELS, OR UNKNOWN LEVELS	MODERATE LEVELS OR LEVELS THAT CANNOT BE SENSED DURING A SITE VISIT BUT WHICH CAN BE CONFIRMED BY A LABORATORY ANALYSIS	HIGH LEVELS OR LEVELS THAT CAN BE SENSED EASILY BY INVESTIGATORS DURING A SITE VISIT
TYPE OF CONTAMINATION	NO CONTAMINATION	SOIL CONTAMINATION ONLY	BIOTA CONTAMINATION	AIR, WATER, OR FOOD STUFF CONTAMINATION
DISTANCE TO NEAREST SURFACE WATER	GREATER THAN 5 MILES	1 TO 5 MILES	1,001 FEET TO 1 MILE	0 TO 1,000 FEET
DEPTH TO GROUNDWATER	GREATER THAN 100 FEET	51 TO 100 FEET	21 TO 50 FEET	0 TO 20 FEET
NET PRECIPITATION	LESS THAN -10 INCHES	-10 TO +5 INCHES	+5 TO +20 INCHES	GREATER THAN +20 INCHES
SOIL PERMEABILITY	GREATER THAN 50% CLAY	30% TO 50% CLAY	15% TO 30% CLAY	0 TO 15% CLAY
BEDROCK PERMEABILITY	IMPERMEABLE	RELATIVELY IMPERMEABLE	RELATIVELY PERMEABLE	VERY PERMEABLE
DEPTH TO BEDROCK	GREATER THAN 60 FEET	31 TO 60 FEET	11 TO 30 FEET	0 TO 10 FEET

Table 1. [illegible] Factors and Scales for Each of the Four Factor Categories

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
WASTE CHARACTERISTICS				
TOXICITY	SAX'S LEVEL 0 OR NFPA'S LEVEL 0	SAX'S LEVEL 1 OR NFPA'S LEVEL 1	SAX'S LEVEL 2 OR NFPA'S LEVEL 2	SAX'S LEVEL 3 OR NFPA'S LEVELS 3 OR 4
RADIOACTIVITY	AT OR BELOW BACKGROUND LEVELS	1 TO 3 TIMES BACKGROUND LEVELS	3 TO 5 TIMES BACKGROUND LEVELS	OVER 5 TIMES BACKGROUND LEVELS
PERSISTENCE	EASILY BIODEGRADABLE COMPOUNDS	STRAIGHT CHAIN HYDROCARBONS	SUBSTITUTED AND OTHER RING COMPOUNDS	METALS, POLYCYCLIC COMPOUNDS AND HALOGENATED HYDROCARBONS
IGNITABILITY	FLASH POINT GREATER THAN 200° OR NFPA'S LEVEL 0	FLASH POINT OF 140°F. to 200°F. OR NFPA'S LEVEL 1	FLASH POINT OF 80°F. TO 140°F. OR NFPA'S LEVEL 2	FLASH POINT LESS THAN 80°F OR NFPA'S LEVELS 3 OR 4
REACTIVITY	NFPA'S LEVEL 0	NFPA'S LEVEL 1	NFPA'S LEVEL 2	NFPA'S LEVELS 3 OR 4
CORROSIVENESS	pH OF 6 TO 9	pH OF 5 TO 6 OR 9 TO 10	pH OF 3 TO 5 OR 10 TO 12	pH OF 1 TO 3 OR 12 TO 14
SOLUBILITY	INSOLUBLE	SLIGHTLY SOLUBLE	SOLUBLE	VERY SOLUBLE
VOLATILITY	VAPOR PRESSURE LESS THAN 0.1 mm Hg	VAPOR PRESSURE OF 0.1 TO 25 mm Hg	VAPOR PRESSURE OF 78 TO 25 mm Hg	VAPOR PRESSURE GREATER THAN 78 mm Hg
PHYSICAL STATE	SOLID	SLUDGE	LIQUID	GAS
WASTE MANAGEMENT PRACTICES				
SITE SECURITY	SECURE FENCE WITH LOCK	SECURITY GUARD BUT NO FENCE	REMOTE LOCATION OR BREACHABLE FENCE	NO BARRIERS
HAZARDOUS WASTE QUANTITY	0 TO 250 TONS	251 TO 1,000 TONS	1,001 TO 2000 TONS	GREATER THAN 2,000 TONS
TOTAL WASTE QUANTITY	0 TO 10 ACRE FEET	11 TO 100 ACRE FEET	101 TO 250 ACRE FEET	GREATER THAN 250 ACRE FEET
WASTE INCOMPATIBILITY	NO INCOMPATIBLE WASTES ARE PRESENT	PRESENT, BUT DOES NOT POSE A HAZARD	PRESENT AND MAY POSE A FUTURE HAZARD	PRESENT AND POSING AN IMMEDIATE HAZARD
USE OF LINERS	CLAY OR OTHER LINER RESISTENT TO ORGANIC COMPOUNDS	SYNTHETIC OR CONCRETE LINER	ASPHALT BASE LINER	NO LINER USED
USE OF LEACHATE COLLECTION SYSTEMS	ADEQUATE COLLECTION AND TREATMENT	INADEQUATE COLLECTION OR TREATMENT	INADEQUATE COLLECTION AND TREATMENT	NO COLLECTION OR TREATMENT
USE OF GAS COLLECTION SYSTEMS	ADEQUATE COLLECTION AND TREATMENT	COLLECTION AND CONTROLLED FLARING	VENTING OR INADEQUATE TREATMENT	NO COLLECTION OR TREATMENT
USE AND CONDITION OF CONTAINERS	CONTAINERS ARE USED AND APPEAR TO BE IN GOOD CONDITION	CONTAINERS ARE USED BUT A FEW ARE LEAKING	CONTAINERS ARE USED BUT MANY ARE LEAKING	NO CONTAINERS ARE USED

While this list is by no means exhaustive, and other examples may be encountered by raters using the methodology, it does include the more commonly occurring situations. Appendix B provides guidance on the number of additional points that should be assigned for these situations.

In order to maintain the objectivity of the rating methodology while allowing the assignment of additional points, the following limits are placed on the number of additional points that may be assigned in each factor category:

• Receptors	50 points
• Pathways	25 points
• Waste characteristics	20 points
• Waste management practices	30 points.

The number of additional points allowed in each factor category is a function of the total available rating factor points and the relative importance of the category.

The actual procedure for assigning additional points is outlined in Chapter 4.

2.6 HAZARD POTENTIAL SCORES

The result of a site rating is a set of five hazard potential scores. These scores are:

- Overall score
- Receptors subscore
- Pathways subscore
- Waste characteristics subscore
- Waste management practices subscore.

The overall score is based on all the rating factors and additional points that are used to rate a site. Each subscore is based on those rating factors and additional points in that factor category which are used to rate a site. All of these scores are normalized so that they are on a scale of 0 to 100. The normalization procedure is described in Chapter 4. Associated with every hazard potential score is a percentage of missing and assumed data. These percentages flag scores that are based on large amounts of missing data and, generally, measure the reliability of the scores. Chapter 5 describes how to interpret these scores.

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